



Beach Changes at Atlantic City, New Jersey (1962-73)

by
Dennis P. McCann

MISCELLANEOUS REPORT NO. 81-3

MARCH 1981



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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM								
1. REPORT NUMBER MR 81-3	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER								
4. TITLE (and Subtitle) BEACH CHANGES AT ATLANTIC CITY, NEW JERSEY (1962-73)		5. TYPE OF REPORT & PERIOD COVERED Miscellaneous Report								
		6. PERFORMING ORG. REPORT NUMBER								
7. AUTHOR(s) Dennis P. McCann		8. CONTRACT OR GRANT NUMBER(s)								
9. PERFORMING ORGANIZATION NAME AND ADDRESS Department of the Army Coastal Engineering Research Center (CERRE-CS) Kingman Building, Fort Belvoir, Virginia 22060		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS D31194								
11. CONTROLLING OFFICE NAME AND ADDRESS Department of the Army Coastal Engineering Research Center Kingman Building, Fort Belvoir, Virginia 22060		12. REPORT DATE March 1981								
14. MONITORING AGENCY NAME & ADDRESS (If different from Controlling Office)		13. NUMBER OF PAGES 142 139								
		15. SECURITY CLASS. (of this report) UNCLASSIFIED								
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE								
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release, distribution unlimited.										
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)										
18. SUPPLEMENTARY NOTES										
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)										
<table border="0"> <tbody> <tr> <td>Atlantic City</td> <td>Beach profiles</td> </tr> <tr> <td>Beach erosion</td> <td>Beaches</td> </tr> <tr> <td>Beach Erosion Program</td> <td>Shoreline changes</td> </tr> <tr> <td>Beach nourishment</td> <td>Shore structures</td> </tr> </tbody> </table>			Atlantic City	Beach profiles	Beach erosion	Beaches	Beach Erosion Program	Shoreline changes	Beach nourishment	Shore structures
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Beach Erosion Program	Shoreline changes									
Beach nourishment	Shore structures									
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)										
<p>Repetitive surveys of the above MSL beach were made along seven profile lines at Atlantic City, on the northeast end of Absecon Island, New Jersey, from 1962 to 1973. Major beach-fill projects were accomplished in 1963 and 1970 which introduced approximately 428,000 and 635,000 cubic meters of fill material, respectively, to the northernmost half of the study area; movements of this material are discussed. Seventeen storms were reasonably well</p> <p>(continued)</p>										

documented during the study and their effects are reported. Measured storm changes were highly variable. For a given storm, adjacent profiles often indicated opposite changes, with one accreting and one eroding. This is attributed to structural effects, as well as wave refraction effects near Absecon Inlet. Storm changes of the MSL shoreline position were often opposite in sign from beach volume changes. Frequently, the shoreline change indicated accretion, while the beach volume actually suffered a net loss. The largest beach changes measured resulted from the storm of 23 September 1964, which eroded an average of about 23 cubic meters per meter of beach face above MSL, and the storms of 16 September 1967 and 25 February 1968, which caused an average shoreline recession of 5.9 meters. Beach changes were found to be seasonal, with the greatest volume of sand above MSL from May to October. The data collected provide no information on the profile changes occurring below MSL.

PREFACE

This report is published to provide coastal engineers with a description of beach changes at Atlantic City, New Jersey. The 11-year study was designed to measure beach responses to storm events as well as seasonal variations, and was begun shortly after, and as a consequence of the devastating storm of 5 to 9 March 1962. The work was carried out under the coastal processes program of the U.S. Army Coastal Engineering Research Center (CERC).


The report was prepared by Dennis P. McCann with the assistance of A.E. DeWall, under the general supervision of C. Mason, former Chief of the Coastal Processes Branch, Research Division.

The U.S. Army Engineer District, Philadelphia, performed all survey work except for a period in 1963-64 when data collection was contracted to Mauzy, Morrow & Associates of Lakewood, New Jersey. All data analyses and interpretations were made at CERC with assistance by M. Fleming, T. Lawler, D. French, A.E. DeWall, and W.A. Birkemeier.

Special thanks are extended to the visual observers from the City Engineer's Office of Atlantic City: J. Dolan, R. Badger, C. Turner, and C. McDonnell. Thanks are also extended to C.H. Everts, C. Galvin, K. Jacobs, M.T. Czerniak, and A.E. DeWall for their substantial contributions to this report from previous work on this subject. The author acknowledges the helpful review comments from A.E. DeWall, W.A. Birkemeier, C. Galvin, R.M. Sorensen, and R.J. Hallermeier.

Comments on this publication are invited.

Approved for publication in accordance with Public Law 166, 79th Congress, approved 31 July 1945, as supplemented by Public Law 172, 88th Congress, approved 7 November 1963.


TED E. BISHOP
Colonel, Corps of Engineers
Commander and Director

CONTENTS

	Page
CONVERSION FACTORS, U.S. CUSTOMARY TO METRIC (SI).....	7
I INTRODUCTION.....	9
II STUDY AREA.....	9
1. Location.....	9
2. Civil Works History.....	10
3. Beach Material.....	15
4. Wind, Wave, and Tide Data.....	17
III DATA COLLECTION AND ANALYSIS.....	23
1. Establishment of Profile Lines.....	23
2. Frequency of Surveys.....	27
3. Field Survey Technique.....	28
4. Accuracy of Field Surveys.....	29
5. Data Reduction and Quality Control.....	30
6. Data Analysis.....	30
IV RESULTS.....	31
1. Short-Term Changes.....	31
2. Long-Term Changes.....	45
V DISCUSSION.....	48
1. Profile Changes.....	48
2. Seasonal Changes and Wave Climate.....	50
3. Coastal Engineering Implications.....	51
VI SUMMARY.....	52
LITERATURE CITED.....	54
APPENDIX	
A PROFILE LINE DOCUMENTATION.....	57
B PROFILE LINE SURVEY DATA.....	65
C STORM CHANGE PLOTS - PROFILE COMPARISON FOR SURVEY OF SEVEN PROFILE LINES AT ATLANTIC CITY.....	118
D MSL SHORELINE CHANGES.....	128
E ABOVE MSL UNIT VOLUME CHANGES.....	133
F PROFILE ENVELOPES.....	138

TABLES

1 Structures along Absecon Inlet and the coast off Atlantic City.....	13
2 Height of storm tides at Atlantic City.....	24
3 Extreme high tides at Atlantic City.....	24

CONTENTS

TABLES--Continued

	Page
4 Summary of physical characteristics at Atlantic City.....	26
5 Atlantic City storm data.....	33

FIGURES

1 Study area showing profile line locations.....	10
2 Bathymetry off Absecon Island.....	11
3 Structures along Absecon Inlet and Atlantic City ocean front.....	12
4 Aerial view of Absecon Inlet and Atlantic City.....	14
5 Southward decrease in median grain size at Atlantic City.....	15
6 Median grain-size variation across profile at Atlantic City.....	16
7 Median grain-size variation across profile at Atlantic City.....	16
8 Monthly median grain-size variation at Atlantic City.....	16
9 Wind data for Atlantic City.....	18
10 Mean monthly wind speed and direction at Atlantic City.....	18
11 Annual wind distribution by percent frequency and mean speed for Atlantic City.....	19
12 Wave approach at Steel Pier.....	20
13 Mean wave direction by month for visual observations obtained from January 1968 to October 1974.....	20
14 Average significant wave height and average wave period by month from April 1964 to December 1967.....	21
15 Means of wave periods for Atlantic City.....	21
16 Maximums and means of significant wave height for Atlantic City.....	22
17 Average number of tropical cyclones occurring per month in the North Atlantic Ocean.....	22
18 Frequency of maximum monthly high tides at Atlantic City.....	25
19 Change in sea level with respect to adjacent land for Atlantic City...	25
20 Frequency of surveys at Atlantic City.....	27
21 Total number of beach profile surveys, by month, at Atlantic City....	27
22 Surveying crew setting up for another reading.....	28
23 Rodman in the surf.....	29
24 BEP data processing.....	31
25 Change in MSL shoreline at profile line, Δs	31
26 Change in unit storage volume at profile line, Δv	32
27 Mean and standard deviation of unit volume changes by profile for 17 selected storms at Atlantic City.....	34

CONTENTS

FIGURES--Continued

	Page
28 Mean and standard deviation of unit volume changes by contour for 17 selected storms at Atlantic City.....	35
29 Comparison of unit volume changes and MSL shoreline position changes by profile for 17 selected storms.....	36
30 Trends in volume change versus shoreline change for 17 selected storms.....	38
31 Limits of 1963 and 1970 beach fills at Atlantic City.....	38
32 Cross section of beach from profiles taken before and after beach nourishment in 1963 and 1970.....	39
33 Sediment volume measurements between surveys relative to first survey.....	39
34 View of scarp just north of profile line 2.....	40
35 View landward from waterline at profile line 2.....	40
36 View of groin at Vermont Avenue from under the Boardwalk at Rhode Island Avenue.....	41
37 View of groin south of Rhode Island Avenue from under the Boardwalk at profile line 2.....	41
38 View of erosion-scour at the base of the convalescent home on the south side of Rhode Island Avenue.....	42
39 Looking shoreward from waterline at California Avenue on 9 March 1979.....	42
40 Borrow site under Boardwalk at Richmond Avenue on 9 March 1979.....	43
41 Trucks waiting to be filled with sand near Raleigh Avenue.....	43
42 Front loader filling truck with sand excavated from under the Boardwalk near Raleigh Avenue.....	44
43 Site of beach fill near St. James and New York Avenues.....	44
44 MSL shoreline changes in time.....	46
45 Mean above MSL unit volume changes and MSL shoreline position changes by month.....	46
46 Cumulative yearly change in unit volume and MSL shoreline at Atlantic City.....	47
47 Long-term changes in unit volume and MSL shoreline from 1963-69 to eliminate effects of 1970 beach fill.....	47
48 Shoreline changes at Atlantic City, 1841-1948.....	49
49 Profile changes along Atlantic City, 1936-48.....	50
50 Mean monthly gage and visual data for wave heights and periods for Atlantic City.....	51

CONVERSION FACTORS, U.S. CUSTOMARY TO METRIC (SI) UNITS OF MEASUREMENT

U.S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

Multiply	by	To obtain
inches	25.4	millimeters
	2.54	centimeters
square inches	6.452	square centimeters
cubic inches	16.39	cubic centimeters
feet	30.48	centimeters
	0.3048	meters
square feet	0.0929	square meters
cubic feet	0.0283	cubic meters
yards	0.9144	meters
square yards	0.836	square meters
cubic yards	0.7646	cubic meters
miles	1.6093	kilometers
square miles	259.0	hectares
knots	1.852	kilometers per hour
acres	0.4047	hectares
foot-pounds	1.3558	newton meters
millibars	1.0197×10^{-3}	kilograms per square centimeter
ounces	28.35	grams
pounds	453.6	grams
	0.4536	kilograms
ton, long	1.0160	metric tons
ton, short	0.9072	metric tons
degrees (angel)	0.01745	radians
Fahrenheit degrees	5/9	Celsius degrees or Kelvins

To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use formula: $C = (5/9) (F - 32)$.

To obtain Kelvin (K) readings, use formula: $K = (5/9) (F - 32) + 273.15$.

BEACH CHANGES AT ATLANTIC CITY, NEW JERSEY (1962-73)

by
Dennis P. McCann

I. INTRODUCTION

Beach changes observed during repetitive surveys at Atlantic City, New Jersey, conducted by or for the Corps of Engineers in a 11-year study of seven profile lines from October 1962 to May 1973, are analyzed as part of the U.S. Army Coastal Engineering Research Center (CERC) Beach Evaluation Program (BEP) (formerly known as the Pilot Program for Improving Coastal Storm Warnings or Storm Warning Program). The BEP's objective is to measure beach and dune changes due to erosion and accretion at selected localities and relate these changes to the coastal processes producing them. The BEP was a direct outcome of investigations into the effects of the Great East Coast Storm of 1962 (see U.S. Congress, 1962).

Although this report meets the objective of the BEP, the program encountered many difficulties, including relatively few documented storms in the study area from 1962 to 1973 (the duration of the study), the difficulty in obtaining surveys immediately before and after the storms which did occur, and the difficulty and expense of obtaining continuous wave data. However, numerous data were collected of related wave, tide, and beach conditions, thus providing a substantial base for a long-term study of beach response having useful engineering applications.

This report presents both quantitative and qualitative analyses of beach profile changes and supporting data obtained at Atlantic City, and describes the survey procedures used and accuracy obtained. The three categories of beach profile changes analyzed are: (a) short-term changes, including storm-induced changes and other changes between surveys; (b) long-term changes, including seasonal and yearly changes; and (c) artificial effects, which include the effects of manmade structures such as groins and jetties as well as beach fill placed during the study period. The mean sea level (MSL) shoreline position and the volumes of sand stored on the beach above the MSL datum are the two principal variables analyzed. Observed wave conditions and climatic conditions are used to explain apparent trends in beach changes.

II. STUDY AREA

1. Location.

Atlantic City is located on Absecon Island, a barrier island off the Atlantic coast of southern New Jersey, 161 kilometers south of New York City (Fig. 1). The island is bounded on the south by Great Egg Harbor Inlet, and on the north by Absecon Inlet, and has a straight coastline oriented 64° east of north. Lakes Bay is the main body of water separating the island from the mainland.

Absecon Island is situated in an open section of coastline, partially sheltered by Long Island and Cape Cod from waves out of the north and north-east and by the Outer Banks of North Carolina from waves out of the south-southeast (Fig. 1). Bathymetry off the coast of Absecon Island is shown in

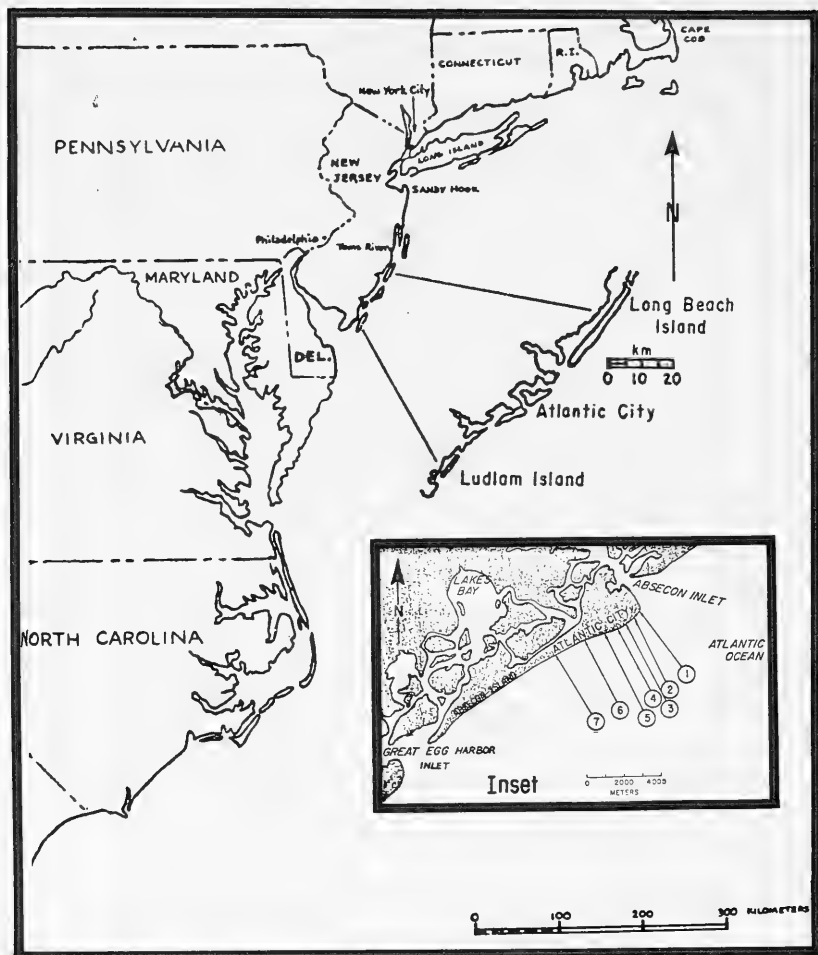


Figure 1. Study area showing profile line locations.

Figure 2. Most of the depth contours tend to be roughly shore-parallel, with linear shoals that trend toward the east off the central part of the island. The distance from the edge of the Continental Shelf, located at a depth of about 128 meters (420 feet), to the center of the island is approximately 125 kilometers.

2. Civil Works History.

Absecon Inlet is of great economic importance to Atlantic City as a result of its extensive use by recreational and commercial fishing fleets. During the early 1960's the inlet handled approximately 91,000 metric tons of water-borne commerce annually; however, this has recently tapered off to average

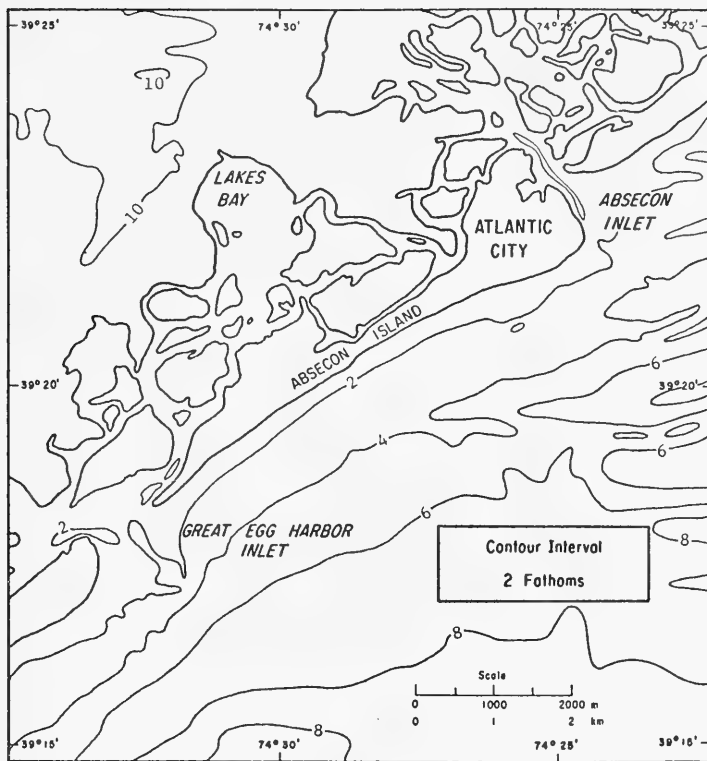


Figure 2. Bathymetry off Absecon Island.

less than 46,000 metric tons. Absecon Inlet has been maintained by the Federal Government since 1910.

Groin construction along the ocean frontage of Atlantic City, funded jointly by the City and State, began in 1928; 12 groins and 1 jetty were built between Absecon Inlet and Illinois Avenue. Eight of these groins and the jetty are still in existence, as shown in Figure 3 and in Table 1 which lists the coastal structures at Atlantic City. Other major structures (see Table 1 and Fig. 3) include the Boardwalk, which extends along the entire length of the ocean and inlet frontage, and five piers. Some of these structures are shown in Figure 4.

The only beach-fill project before 1962 consisted of about 816,000 cubic meters of material placed along the ocean frontage in 1948. However, an off-shore sand-dumping test was conducted from 1935 to 1943 in which 2.7 million cubic meters was dumped into 5 to 6 meters of water southwest of Steel Pier which resulted in no measurable benefit to the shoreline (Yasso and Hartman, 1975). Approximately 428,000 cubic meters of sand was placed between Oriental and Virginia Avenues between February and May 1963. During the summer of 1970, approximately 635,000 cubic meters of fill was dumped along the beaches

Table 1. Structures along Absecon Inlet and the coast off Atlantic City¹.

Location	Construction type	Top elevation (MLW)		Top width (m)	Length (m)	Year built	Condition 1972
		inner (m)	outer (m)				
N. side of Absecon Inlet	Stone jetty	2.44	2.44	4.57	1,137.00	1952-66	Good
Between Caspian and Melrose Aves.	Timber bulkhead	----	----	0.76	588.00	1935	Good
Adriatic Ave.	Timber and stone groin	2.44	2.13	4.27	86.56	1932-58	Good
Drexel Ave.	Timber and stone groin	2.44	2.13	4.27	50.29	1930-46	Fair
Melrose Ave.	Timber and stone groin	2.44	2.13	4.27	81.38	1954	Good
Melrose Ave. to 91 m south	Stone revetment	----	----	----	----	----	----
Madison Ave.	Timber and stone groin	2.74	2.13	4.27	68.58	1954	Good
Between Madison and Euclid Aves.	Timber bulkhead groin	----	----	0.61	457.20	1935-61	Good
Grammercy Ave.	Timber and stone groin	2.74	2.13	4.27	79.25	1954	Good
Between Grammercy and Atlantic Aves.	Stone groin	3.05	2.13	4.27	102.41	1946-56	Good
Between Atlantic and Euclid Aves.	Stone groin	2.74	2.13	4.27	94.49	1946-58	Good
Pacific Ave.	Stone groin	2.44	2.13	4.27	102.41	1946-58	Good
Oriental Ave. (36.6 m N. of profile 1)	Stone jetty	3.35	2.13	4.27	358.75	1946-61	Good
Vermont Ave.	Stone groin	3.05	0.30	4.27	121.92	1930-61	Good
Massachusetts Ave.	Stone groin	3.05	2.13	4.57	167.64	1948	Good
Between Vermont and Massachusetts Aves.	Sandbag breakerwater	Top is approx. 1.2 m below MLW					
Between Connecticut and Massachusetts Aves.	Timber bulkhead	----	----	----	----	1932	Poor
Connecticut Ave.	0.5-m outfall	----	----	----	----	----	----
Under N. edge of Garden Pier	Timber and stone groin	----	----	----	----	----	Poor
New Jersey Ave.	Garden Pier (0.76-m outfall)	----	----	----	----	----	----
Delaware Ave. (4.6 m N. of profile 3)	Timber groin	2.44	2.13	1.22	182.88	1950	Fair
Virginia Ave.	Timber and stone groin (0.76-m outfall)	2.44	2.13	1.22	167.64	1950	Good
Between Presbyterian and Virginia Aves.	Steel Pier (old timber groin beneath)	----	----	----	----	----	----
Between North Carolina and Pennsylvania Aves.	Steeplechase Pier (0.91-m outfall to S.)	----	----	----	----	----	----
Between North and South Carolina Aves.	Timber groin (60 m S. of profile 4)	2.44	2.13	1.22	182.88	1950	Good
Tennessee Ave. (N. of Central Pier)	Stone groin	2.44	2.13	4.27	43.59	1928	Poor
Between Tennessee Ave. and St. James Place	Central Pier-Timber groin (0.76-m outfall)	----	----	----	----	----	----
St. James Place	Timber groin	2.44	0.61	1.22	147.83	1950	Fair
Illinois Ave.	Timber and stone groin (0.91-m outfall)	2.44	0.61	1.22	182.88	1950	Poor
Arkansas Ave.	0.91-m outfall at N. edge of Million Dollar Pier	----	----	----	----	----	----
Mississippi Ave.	0.61-m double outfall	----	----	----	----	----	----
Florida Ave.	0.61-m outfall	----	----	----	----	----	----
California Ave.	0.91-m outfall	----	----	----	----	----	----
Boston Ave.	0.91-m outfall	----	----	----	----	----	----
Raleigh Ave.	1.5-m sewage pipe extending 457 m to diffuser	----	----	----	----	----	----

¹Updated from U.S. Army Engineer District, Philadelphia (1974).

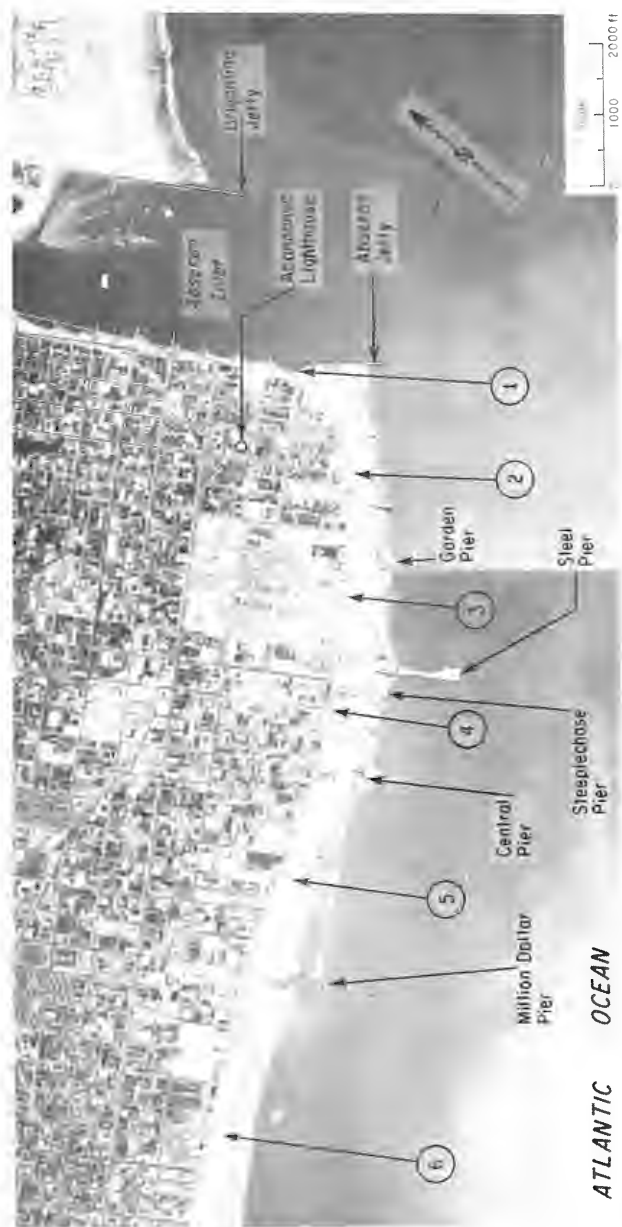


Figure 4.. Aerial view of Absecon Inlet and Atlantic City (30 April 1973).

between Oriental and Illinois Avenues (Fig. 3). The source of this dredged material has been Absecon Inlet, just inside the Brigantine jetty (Fig. 4) (Everts, DeWall, and Czerniak, 1974).

A detailed discussion of civil works affecting the beaches on Absecon Island is presented by U.S. Army Engineer District, Philadelphia (1974).

3. Beach Material.

New Jersey beaches consist mainly of medium- to fine-grained sand, composed mostly of quartz. The Piedmont and Highlands of the Appalachian Province provide the ultimate source of the beach sands. Presently, due to the low terrain and gentle slopes of the Coastal Plain, the rivers draining the higher areas become sluggish and deposit much of their sediment load along the way before reaching the coast. What little sediment does reach the coast becomes trapped in the lagoons behind the barrier islands, and never reaches the beaches. The only natural sources of beach material now appear to be the ocean floor and the beaches themselves.

Ramsey and Galvin (1977) found the median grain size at Atlantic City to be 0.27 millimeter (1.9 phi), with a sample range of 0.22 to 0.33 millimeter, which agrees with the values obtained from surveys taken in 1936 and 1947 (Beach Erosion Board, 1950). They also determined that the grain size decreased from the north to the south, the direction of net littoral transport. This trend of decreasing grain size from north to south is shown in Figure 5 which indicates the southward decrease in grain size across three profiles at Atlantic City. A spatial trend in grain-size variation from the berm to mean low water (MLW) is also indicated in Figure 6 for the sample averages and in Figure 7 for the profile averages. These plots show an increase in grain size from the berm to MSL, and then a slight decrease from MSL to MLW. A seasonal grain-size variation shown in Figure 8 indicates that the grain size increases from about 0.25 millimeter in October to 0.30 millimeter in December while decreasing from about 0.30 millimeter in December to 0.26 millimeter in March. This trend suggests an increase in the slope of a stable foreshore from October to December when the sizes are increasing and a decrease in foreshore slope when the grain sizes are decreasing from December to March.

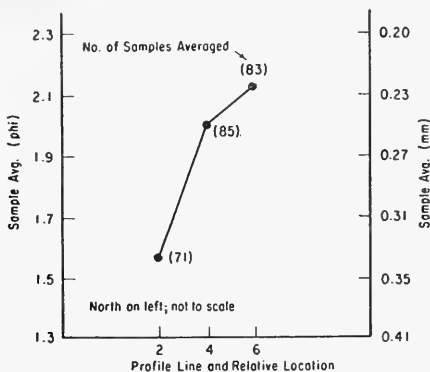


Figure 5. Southward decrease in median grain size at Atlantic City; sample averages are by profile line (from Ramsey and Galvin, 1977).

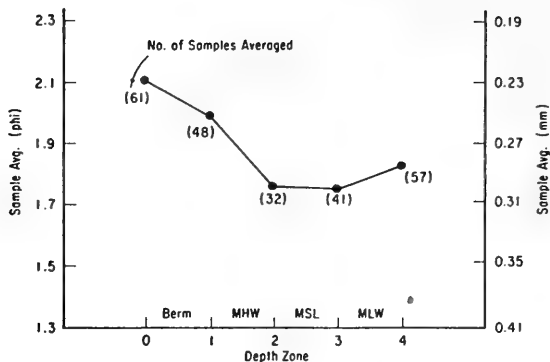


Figure 6. Median grain-size variation across profile at Atlantic City; data consisted of 238 samples collected between January 1968 and March 1969 (from Ramsey and Galvin, 1977).

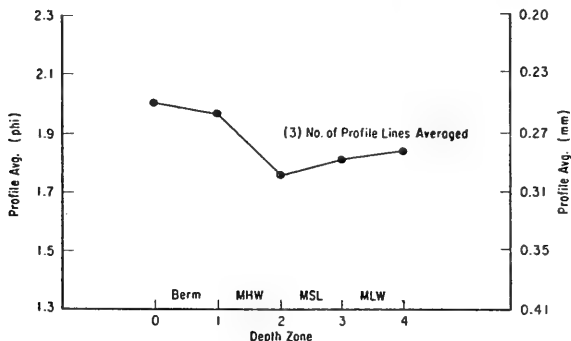


Figure 7. Median grain-size variation across profile at Atlantic City (from Ramsey and Galvin, 1977).

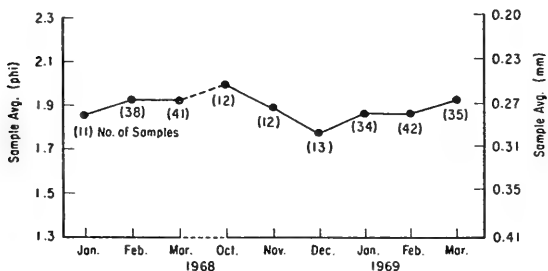


Figure 8. Monthly median grain-size variation at Atlantic City; samples were taken from the berm to below MSL (from Ramsey and Galvin, 1977).

The net littoral transport rate along Absecon Island is estimated to be 115,000 cubic meters annually in a southwesterly direction as determined from estimated gross northerly and southerly annual rates of 191,000 and 306,000 cubic meters, respectively (U.S. Army Engineer District, Philadelphia, 1974). Further evidence for southwest littoral transport is shown by Everts (1975) in the pattern of deposition that decreased the width of Great Egg Harbor Inlet (Fig. 1) 30 percent from 1949 to 1974. Everts also concludes that possibly 25 percent of the longshore transport could be accounted for by sand movement on bars.

Taking into consideration the previously mentioned lack of supply of beach material from natural sources along with the net littoral transport to the southwest, it is obvious that this imbalance of material leaving and entering the area results in erosion of the beaches. These circumstances, in turn, would require occasional beach nourishment to sustain the beach. Two such beach-fill projects were accomplished during the study period, as previously mentioned, with the fill material having a mean grain size of 0.3 millimeter (Everts, DeWall, and Czerniak, 1974). A buildup of sand occurred from 1877 to 1939 on the northern end of Absecon Island, which resulted in the Absecon Lighthouse being so far inland today.

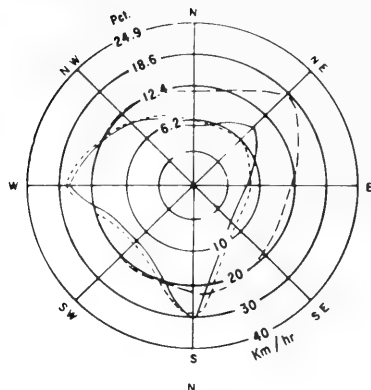
4. Wind, Wave, and Tide Data.

Wind data shown in Figure 9 consist of hourly records obtained before the profile study period by the National Weather Service (NWS) from an anemometer atop the now abandoned Absecon Lighthouse (Fig. 4). Analysis of these data indicates that the predominant wind directions are from the south and west. The corresponding wind velocity from these directions is generally in the 22.5- to 45-kilometer-per-hour range (Fig. 9,b). This agrees with the resultant wind direction determined from data taken 16 kilometers inland at the Aviation Facilities Experimental Station from 1968-72 (Fig. 10). Figure 9,b also shows that most of the high-velocity winds (46.7+ kilometers per hour) were from the northeast. The *resultant* wind direction, as shown in Figure 10, is the magnitude of the vector sum of wind directions, and the average wind-speed indicated is the sum of the recorded windspeeds divided by the number of observations.

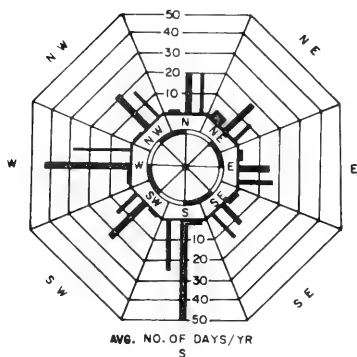
Winds are from the west-northwest during the winter months of November to March. From March to July the winds shift to the south with a shift back to the west from July to September. After an abrupt shift back to due south in October, the winds return to the west-northwest direction of the winter (Fig. 10).

Data from the Summary of Synoptic and Meteorological Observations (SSMO) (U.S. Naval Weather Service Command, 1970) show the predominant wind directions offshore of Atlantic City throughout the year (Fig. 11). Monthly data indicate that the winter winds of November to March are from the west and northwest, whereas the spring and summer winds of April to August are from the south and southwest. These trends are in general agreement with those indicated above for winds measured inland, except that neither September nor October show directions nearly as predominant as the other months.

The bearing of a line normal to the Atlantic City beach at Steel Pier is approximately 26° east of south. Waves impinging from east of the normal



a. WIND DATA, 1923 -1952



b. WIND DATA, 1936 -1952

Figure 9. Wind data (yearly averages) for Atlantic City (from U.S. Army Engineer District, Philadelphia, 1974).

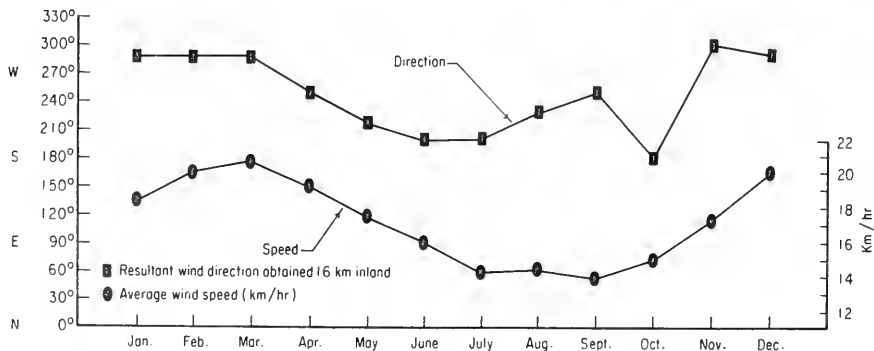


Figure 10. Mean monthly wind speed and direction at Atlantic City (1968-72).

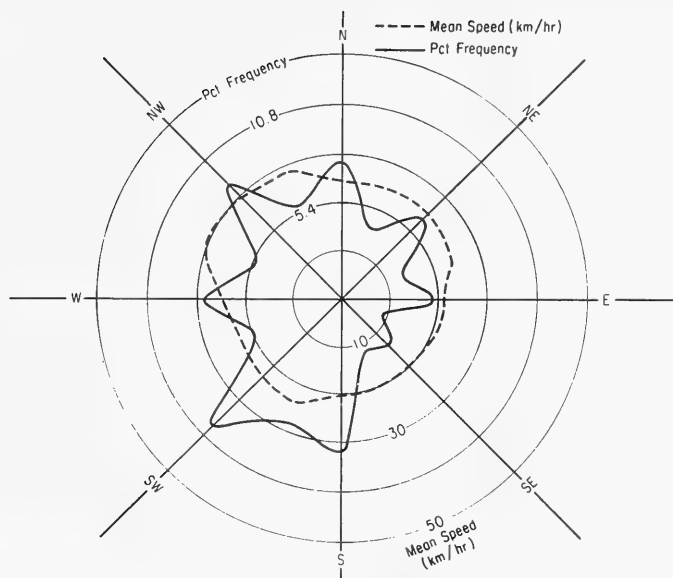


Figure 11. Annual wind distribution by percent frequency and mean speed for Atlantic City. Data obtained from SSMO (U.S. Naval Weather Service Command, 1970) collected during 1949-68 and covering the area from 38° to 40° N. latitude and 72° W. longitude to the coast.

result in a southwest, or "down-beach drift"; waves from west of the normal produce a northeast, or "up-beach drift." Results from visual wave observations obtained at different times at Atlantic City indicate that waves east of the normal occur greater than 50 percent of the time (Figs. 12 and 13). An earlier report by the U.S. Army Engineer District, Philadelphia (1938), also indicated a predominant down-beach drift occurring about 48 percent of the time compared to about 24 percent up-beach drift and 28 percent onshore-offshore drift.

CERC maintained a relay-type wave gage on the end of Steel Pier (5.2 meters mean water depth) from 1962 to 1969, which measured water surface elevations in 6-centimeter increments. These data, analyzed by Thompson (1977), indicate that during 1964 to 1967 the average significant wave height and average wave period increased substantially in September (Fig. 14). This is also in general agreement with Figure 4-10 in the Shore Protection Manual (SPM) (U.S. Army, Corps of Engineers, Coastal Engineering Research Center, 1977). The explanation for this behavior during this particular period is shown in Figures 15 and 16 which give the values by month for each of the years considered. The peak in values of period and height during September 1964 can be attributed to Hurricanes Dora, Ethel, and Gladys offshore along the Atlantic coast. Although none of these hurricanes directly hit New Jersey, they generated large waves which reached the shore. Historically, there is a substantial increase in tropical cyclones and hurricanes in the North Atlantic Ocean during September (Fig. 17); however, only a few

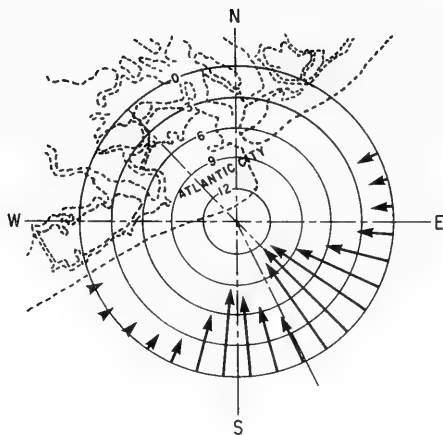


Figure 12. Wave approach at Steel Pier. Length of arrows indicates the percentage of wave approach from the various directions as determined by periodic observations at the end of Steel Pier during November 1935 to May 1937, and July 1947 to March 1948 (from Beach Erosion Board, 1950).

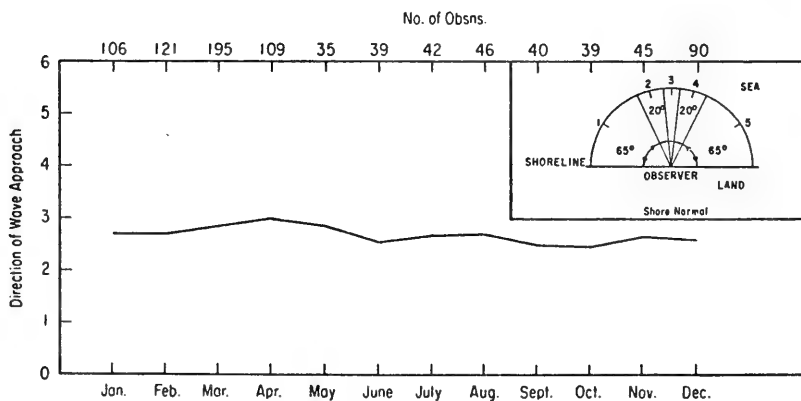


Figure 13. Mean wave direction by month for visual observations obtained from January 1968 to October 1974.

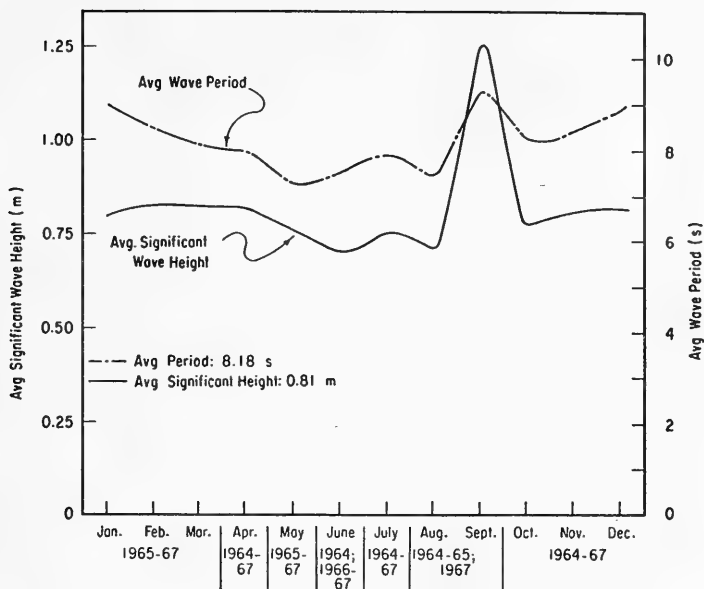


Figure 14. Average significant wave height and average wave period by month from April 1964 to December 1967.

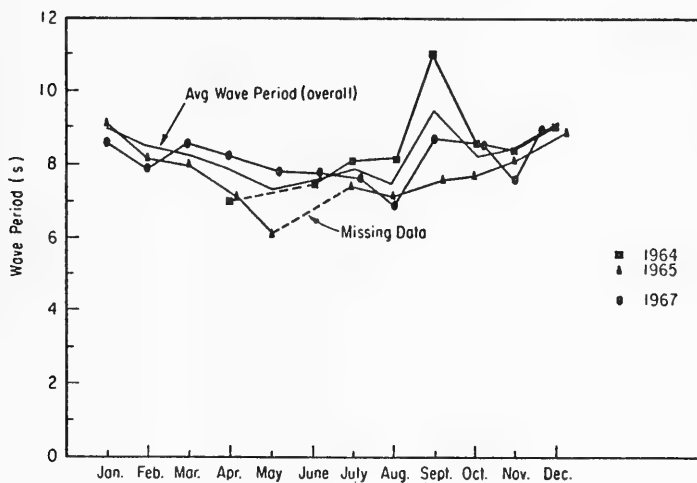


Figure 15. Means of wave periods for Atlantic City; determined from 7-minute pen-and-ink records taken six times daily during 1964, 1965, and 1967 (from Thompson, 1977).

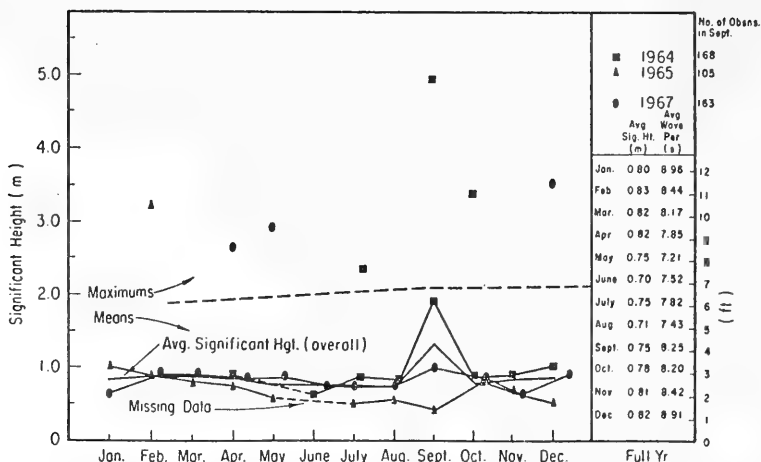


Figure 16. Maximums and means of significant wave height for Atlantic City; determined from 7-minute pen-and-ink records taken six times daily during 1964-65 and 1967. Values for September were obtained by determining the mean from the respective plot for height and period for 1965 and 1967, then weighted by the number of observations during 1964, 1965, and 1967 to arrive at an average for the years 1965 and 1967; all other average values include the monthly values for 1964, 1965, and 1967 (from Thompson, 1977).

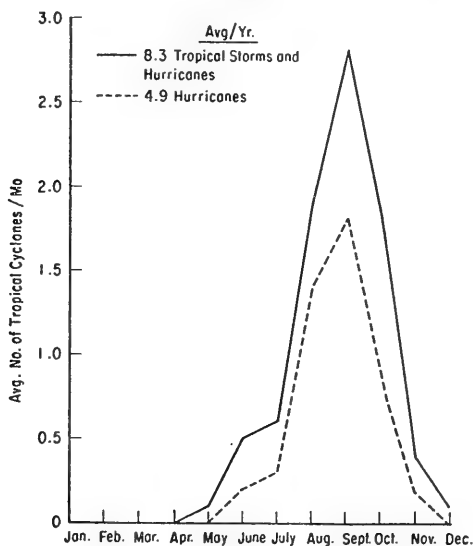


Figure 17. Average number of tropical cyclones occurring per month (1886-1977) in the North Atlantic Ocean (excluding depressions but including subtropical systems) (from National Weather Service, 1978).

hurricanes directly impact on Atlantic City (two "direct hits" from 1899-1977 were recorded by the National Weather Service, 1978). Most hurricanes remain offshore in this area, producing indirect effects such as increased wave heights. Extratropical storms, particularly northeasters, are second only to hurricanes in their destructive intensity causing considerable damage to the beaches and structures along the New Jersey coast. The resultant damage from these storms is largely due to the high winds, waves, and increased water levels they generate.

The astronomical tides at Atlantic City are semidiurnal and have been monitored almost continuously since 1912 from a primary tide station located on Steel Pier. The mean tidal range is 1.25 meters, with the normal tidal range varying from 0.98 meter for neap tides to 1.52 meters for spring tides. The highest recorded storm tide at Atlantic City, 2.32 meters above MSL (Table 2), occurred during a hurricane in September 1944. The March 1962 storm caused the second highest storm tide, 2.19 meters above MSL (Table 2). Additional information on extreme high tides and frequency of maximum monthly high tides is provided in Table 3 and Figure 18, respectively (U.S. Congress, 1964a).

The National Ocean Survey's (NOS) accepted mean tidal heights for this location, based on the timespan 1948 to 1966, referenced to the ocean MLW datum, are: mean high water (MHW), 1.25 meters; mean tide level, 0.62 meter; National Geodetic Vertical Datum (NGVD), 0.50 meter; and MSL, 0.63 meter. During the period 1912 to 1969, the apparent secular trend for the change in sea level at Atlantic City was a rise of 0.283 centimeter per year (Hicks, 1972). Approximately 0.1 centimeter per year of this change is due to the glacial-eustatic rise in sea level, with the remainder attributed to subsidence.

The seemingly minor, but never-ending changes in sea level (Fig. 19), spanning years and decades, are masked by the more dramatic changes due to the meteorological and oceanographic parameters affecting the yearly variability in sea level. These include variations in wind, currents, water temperature, salinity, river discharge, and direct atmospheric pressure (Hicks, 1972).

Table 4 provides a summary of physical characteristics relating to Atlantic City.

III. DATA COLLECTION AND ANALYSIS

1. Establishment of Profile Lines.

Seven profile lines were established along azimuths normal to the shoreline in 1962 (Fig. 1). The spacing between adjacent profile monuments generally increased from profile lines 1 to 7 with the smallest distance between profile lines 1 and 2 at 426 meters, and the greatest distance between profile lines 6 and 7 at 1.62 kilometers. Some of these monuments were, however, offset from the actual profile lines. Standard bronze Corps of Engineers' disks were placed on or near profile lines 1 to 4, and 6 in 1975, and profile lines 5 and 7 in 1976. Each monument was then referenced horizontally to the New Jersey Transverse Mercator and vertically to NGVD (sea level datum of

Table 2. Height of storm tides at Atlantic City.

Yr	Mo	Elevation to MSL (m)
1933	Jan.	1.71
1933	Aug.	1.52
1936	Sept.	1.43
1944	Sept.	2.32
1944	Nov.	1.77
1947	Nov.	1.80
1950	Nov.	2.13
1953	Oct.	1.86
1953	Nov.	1.52
1960	Sept.	1.86
1962	Mar.	2.19
1963	Nov.	1.46
1964	Feb.	1.43
1965	Jan.	1.19
1966	Jan.	1.83
1967	Feb.	1.53
1968	Nov.	1.92
1969	Nov.	1.37
1971	Aug.	2.13
1972	Dec.	1.71

Note—Data for 1933-62 from U.S. Congress (1964a); data for 1963-72 compiled by subtracting predicted tides from recorded tides (NOS) to determine highest for the year.

Table 3. Extreme high tides at Atlantic City (from U.S. Congress, 1964a).

3-yr period	Heights above MSL (m)																
	1.01	1.07	1.13	1.19	1.25	1.31	1.37	1.43	1.49	1.55	1.61	1.77	1.80	1.86	2.13	2.32	
	No. of occurrences																
1936-38	205	126	77	44	25	15	7	3	1	--	--	--	--	--	--	--	
1939-41	287	194	129	73	34	20	11	8	5	3	2	--	--	--	--	--	
1942-44	326	213	143	89	43	28	16	10	8	4	3	2	1	1	1	1	
1945-47	338	234	157	99	61	44	19	9	6	3	1	1	1	--	--	--	
1948-50	290	189	126	82	46	37	21	11	5	2	2	1	1	1	1	--	
1951-53	311	203	130	88	52	30	16	7	4	3	1	1	1	1	--	--	
1954-56	344	233	150	98	55	38	19	13	6	1	--	--	--	--	--	--	
1957-59	356	231	140	83	56	29	14	7	4	2	1	--	--	--	--	--	
1960-61 ¹	409	294	213	143	96	66	51	29	18	14	12	3	3	1	--	--	

¹Adjusted by fraction 3/2 to represent a 3-year period for purposes of comparison.

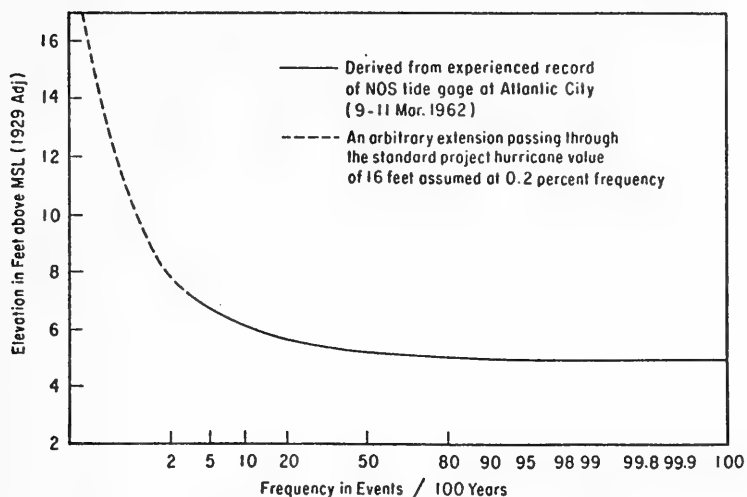


Figure 18. Frequency of maximum monthly high tides at Atlantic City (from U.S. Congress, 1964a).

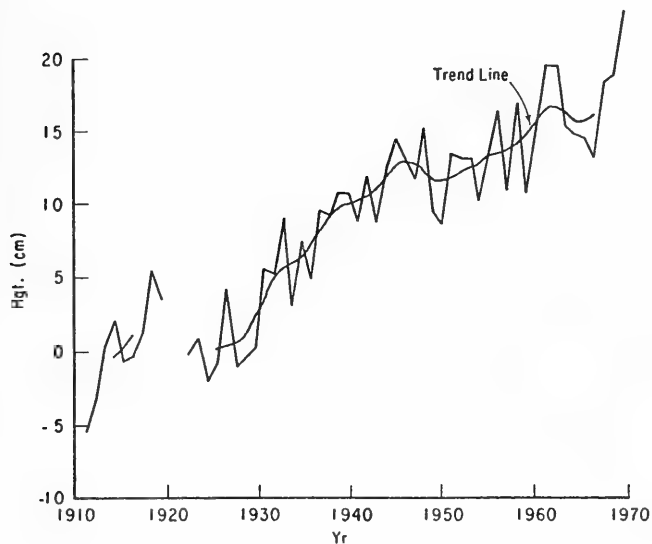


Figure 19. Change in sea level with respect to adjacent land for Atlantic City, 1912 to 1969 (Hicks, 1973).

Table 4. Summary of physical characteristics at Atlantic City.

Characteristic	Description	Source						
Location	Absecon Island, 13 km long; coastline orientation of N. 64° E.							
Length of study area	5 km, from Absecon Inlet Jetty SW.							
Mean tidal range	1.25 m	National Oceanic and Atmospheric Administration (1979)						
Spring tidal range	1.52 m	National Oceanic and Atmospheric Administration (1979)						
Maximum storm surge ¹	2.13 m (Aug. 1971)	National Oceanic and Atmospheric Administration (1972)						
Mean significant wave height	0.81 m (less than 1 pct exceed 3 m)	Thompson and Harris (1972)						
Standard deviation	0.53 m	Thompson (1977)						
Mean wave period	8.18 s	Thompson and Harris (1972)						
Standard deviation	2.43 s	Thompson (1977)						
Breaker type	44.7 pct plunging (PL) 32.0 pct spilling (SP)	Visual obsns. (Jan. 1968 to Oct. 1974)						
Breaker approach	57.7 pct within 5° either side of shore-normal 33.0 pct 5° to 25° left of shore-normal	Visual obsns. (Jan. 1968 to Oct. 1974)						
Beach material	Fine-to-medium grain quartz sand	Ramsey and Galvin (1977)						
Median diameter	0.27 mm	Ramsey and Galvin (1977)						
	Profile							
	1	2	3	4	5	6	7	Avg.
Foreshore slope	0.039	0.066	0.047	0.046	0.046	0.039	0.045	0.047
Berm width from Boardwalk (m)	180	5	75	50	60	90	110	80
Berm height above MSL (m)	1.3	2.3	3.0	2.4	2.2	2.1	2.0	2.2

¹During BEP program.

1929). All survey work for profile documentation was performed by the U.S. Army Engineer District, Philadelphia. Profile line documentation is discussed further in Appendix A.

2. Frequency of Surveys.

The general criteria considered in establishing survey frequencies were the periods of maximum beach change caused by seasonal effects as well as weather forecasts indicating a high probability of beach erosion due to storms. Survey frequency was greatest during the fall and winter months with a particularly large number of surveys taken during the first quarter of 1963, at the beginning of the project, and in 1968-70 when a series of 10 weekly surveys was done. Figures 20 and 21 show the number of surveys at Atlantic City by quarter (3 months) and by month, respectively.

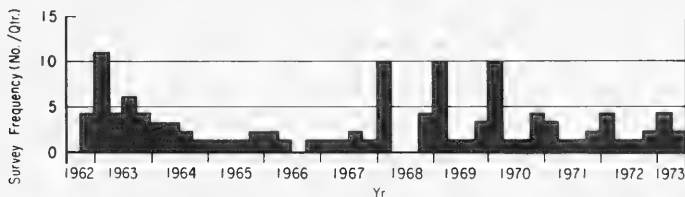


Figure 20. Frequency of surveys at Atlantic City.

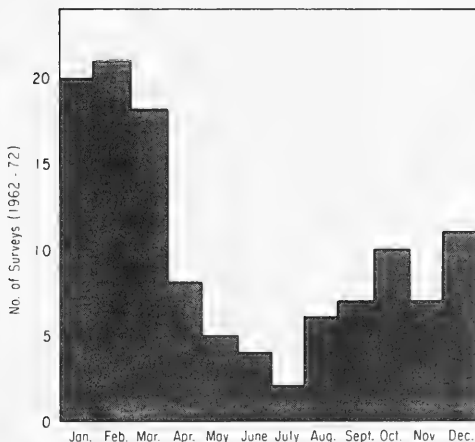


Figure 21. Total number of beach profile surveys, by month, at Atlantic City.

Surveys were initially intended to be conducted every 2 weeks and after significant storms. However, an examination of the initial surveys showed that the engineering significance generally associated with beach changes in a 2-week period was of limited value. Therefore, the interval between regularly scheduled surveys was extended to 1 month or even longer during the summer.

3. Field Survey Technique.

The general data collection procedure consisted of setting up a surveyor's level at or near a previously established point of known elevation or "bench mark," usually located on the seaward side of the Boardwalk (Figs. 22 and 23). Then, using a tape and Philadelphia rod, readings were taken along each profile line at approximately every 15 meters or at breaks in slope. Profile alinement was maintained by sighting on preestablished predominant landmarks such as telephone poles or buildings along the Boardwalk. Horizontal distances were recorded to the nearest 0.3 meter and elevations to the nearest 0.03 meter, except when hand leveling was used.



Figure 22. Surveying crew setting up for another reading (16 January 1968).

When the Philadelphia rod reached an elevation where it was out of view through the level, the general procedure was to hand level down to the surf with the rodman wading out as far as possible. Occasionally, the rod was "boosted" (or raised) a known distance to the top of the rodman's boot or belt to obtain the last point without hand leveling. Turning points were also used; however, before 1972 the leveling was not closed back to either the turning points or to the starting bench mark, so the reliability of the turning points could not be determined.

The surveying party consisted of a six-man hydrographic surveying crew from the Philadelphia District, except for a period in 1963 and 1964 when a private firm was contracted to do the work. The six-man crew either worked as



Figure 23. Rodman in the surf (16 January 1968).

a single crew or split into two three-man crews to expedite the work. The crew also collected sand samples at various times at selected profile lines.

In addition to surveys by conventional surveying methods, an experimental program was conducted to test a method of obtaining profiles by observing sand levels on pipes located at approximately 15-meter intervals along selected profile lines (Urban and Galvin, 1969). Profile lines 5 and 7 at Atlantic City were selected for this program.

To establish the pipe profiles, 6.4-meter-long iron pipes (marked at 0.15-meter intervals and usually marked before emplacement) with 3.8-centimeter (inside) diameters were jettied 4 meters into the sand. A type of reflecting material or a sign was displayed on the pipes as a safety measure for beach buggy traffic at night.

Unpaid local observers enlisted by the Philadelphia District made weekly observations of the sand elevation at each pipe. These observations were recorded on forms and mailed weekly to CERC. At CERC, the sand elevations were converted to elevations above MSL and the data were stored in the standard survey format. These data are available in Urban and Galvin (1969).

4. Accuracy of Field Surveys.

A certain degree of error is inherent in any data collection procedure, even under the most ideal conditions. Some of the possible errors encountered throughout these surveys are discussed below.

Random reading errors were minimized by using a rod graduated in tenths of a foot. Since the only readings requiring a greater precision (to the nearest hundredth of a foot) were at the bench mark and at turning points, and these sight lengths were usually less than 76 meters (250 feet), no significant random error should occur (Czerniak, 1972).

Systematic errors due to condition of the level, rod out of plumb, temperature of tape, slope of tape, and tape not on line were considered insignificant and had no great effect on the data collected. Bad turning points undoubtedly resulted in some error, but since the leveling was not closed back to the bench mark, there is no definite method of determining specifically when an error might have occurred or to what extent. Another source of systematic error results from the sag of the tape and wind effects on taping. The magnitude of this error is assumed to be an average maximum of -0.1 foot per 200 feet of tape length.

Taking into account these error possibilities and various other errors due to human and environmental causes, the data were considered "accurate" if every point on the profile was within ± 0.05 foot vertically and ± 0.5 foot horizontally of the actual values. The data were also considered "dependable" if sufficient checks on the survey data were performed to ensure that no personal errors affected the data. Based on these criteria, it was concluded that the data obtained were of acceptable accuracy and dependability.

5. Data Reduction and Quality Control.

Until 1968, survey data were recorded in field notebooks, reduced and hand-plotted by the surveyors, and then forwarded to CERC. These plots were later digitized and placed in a punchcard format. After 1968, the survey data were still recorded in fieldbooks, but the data were then transferred to optical scanning forms before being sent to CERC. At CERC the data were logged and scanned with an optical mark page reader (OMPR) to produce punchcards. The cards were then read into a computer where the data were processed using an editing program which plotted profile points. From these plots, apparent errors were identified and returned to the surveyors for correction or comment. A final edit check was made and the data were stored in a magnetic-tape format when all detectable errors were satisfactorily corrected.

A quality control study by Czerniak (1973) indicated a 25 percent probability that there would be an error of ± 0.1 foot in the recorded elevation of a surveyed point due to rounding by the survey party in the field. Because of the improbability of this rounding error occurring numerous times on the same profile, this error, if present, should have no adverse affect on any data analysis.

Figure 24 diagrams the basic steps taken throughout the BEP program from the initial observation in the field to the final computer output.

Appendix B provides a tabulation, by profile, of all the survey data collected during the study.

6. Data Analysis.

Two primary parameters calculated from the profile data are (a) the change in MSL shoreline (ΔS) and (b) the change in unit storage volume (ΔV). The first parameter, ΔS , is the horizontal change, between surveys, of the position of MSL at a profile line. If the beach at MSL prograded during the time between surveys, a positive number would result for ΔS ; a negative value would result if the beach receded. The second parameter, ΔV , is the change in volume above MSL between two surveys for a unit width parallel to the shoreline at a profile line. If accretion occurs between surveys, ΔV will have a positive value, and if erosion occurs, ΔV will be negative.

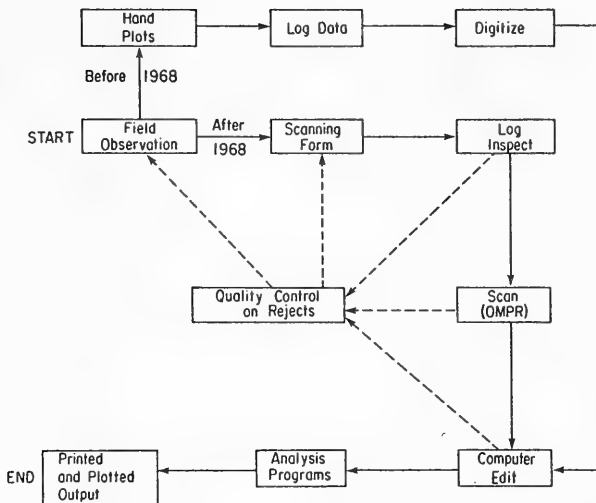


Figure 24. BEP data processing.

The values for ΔS and ΔV are limited in two significant ways (see Figs. 25 and 26). The lower limiting elevation of the surveys for computational purposes is MSL and therefore the values do not provide any indication of changes below MSL. The volume computations are also based on a landward boundary, common to most of the surveys, for each profile line. As a result of these two limiting factors, there generally exists a landward region of change as well as the probably more substantial below-MSL region of change which are not included in the computed volume.

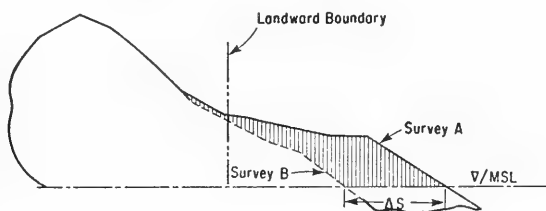


Figure 25. Change in MSL shoreline at profile line, ΔS .

IV. RESULTS

1. Short-Term Changes.

a. Changes During Storms. Storms contribute substantially to short-term beach profile changes by their very nature of short duration and high

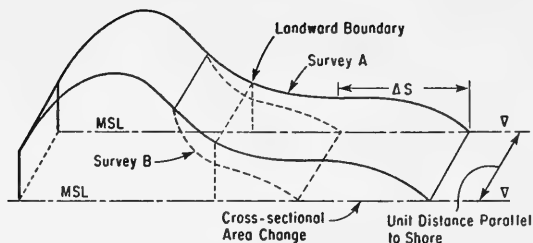


Figure 26. Change in unit storage volume at profile line, ΔV .

intensity. Seventeen storms, predominantly northeasters, were selected for analysis based on the following criteria (see Table 5):

- (1) Existence of prestorm surveys no more than 4 weeks before the storm and poststorm surveys no more than 1 week after the storm;
- (2) data indicating wave heights of 1.22 meters or greater during the storm (this value was arbitrarily chosen due to the 0.85-meter value for mean wave height determined by Thompson and Harris, 1972); and
- (3) no other known significant weather events occurring between surveys.

Visual observations indicate that the predominant breaking wave directions during storms are from the east and southeast. Wave breaker types most commonly observed were either plunging or spilling (Urban and Galvin, 1969). Analysis of the selected storms for which actual tide data were available demonstrated an average maximum storm-generated surge at high water of 0.57 meter.

An effect which must be considered is the timelag between the storm and the poststorm survey which varies from 0 to 6 days. The greater the lag, the more probable that the beach has already begun recovering, thereby not indicating the total storm change (Birkemeier, 1979). (See App. C for plots of prestorm and poststorm surveys.)

Figure 27 depicts the mean and standard deviation of unit volume changes above MSL, by profile, for the selected storms. Due to the relatively few storms analyzed, this information provides only a possible trend of unit volume changes at each profile line. Profile lines 2, 5, 6, and 7 underwent the greatest average unit volume loss of 6 cubic meters per meter or greater during these storms. This is partly explained by the fact that the general direction of longshore transport during storms is from northeast to southwest in this area. Consequently, profile lines 2 and 5 are in littorally depleted locations as a result of updrift groins and other manmade obstructions to littoral drift (see Fig. 3). However, profile lines 6 and 7 are on relatively unobstructed beach, so their changes in unit volume are presumably due to onshore-offshore sand movement, or possibly movement downshore into the unsurveyed part of Absecon Island.

The wide deviation at profile line 1 is undoubtedly a direct consequence of its location immediately downdrift of the Absecon Inlet jetty. Profile line 4, on the other hand, indicates a zero average unit volume change in

Table 5. Atlantic City storm data.

Storm date	Survey dates	Days before survey (No.)	Days after survey (No.)	Max. HW surge		HW surge 20.61 m (67 ft.)	HW surge 20.61 m (67 ft.)	Dates of max. HW surge	Source	Dates of max. wave hgt.	MSL shoreline elev. avg. 1 sec. elev. (m)	Above MSL unit vol. elev. avg. 1 sec. elev. (m ² /m)	
				(m)	(ft.)							(m ² /m)	(m ² /m)
13 Jan. 1964	31 Dec. 1963 to 17 Jan. 1964 ²	13	4	0.66	2.17	1	3	13 Jan. 1964	Gage	-----	2.72	4.89	-20.40
23 Sept. 1964	31 Aug. to 25 Sept. 1964 ²	23	2	0.23	0.77	0	0	22-23 Sept. 1964	Gage	-----	-2.68	12.99	-22.99
16 Sept. 1967	15-19 Sept. 1967	1	3	0.73	2.38	1	2	16 Sept. 1967	Gage	-----	-5.90	10.70	-8.18
25 Jan. 1968	24-30 Jan. 1968	1	5	0.54	1.78	0	3	25 Jan. 1968	Visual	26 Jan. 1968	0.14	5.11	-5.82
8 Feb. 1968	30 Jan. to 8 Feb. 1968 ²	9	0	0.66	2.18	1	1	8 Feb. 1968	Visual	8 Feb. 1968	-0.27	4.48	-6.02
25 Feb. 1968	21-26 Feb. 1968	4	1	0.24	0.78	0	0	25 Feb. 1968	Visual	25 Feb. 1968	-5.90	13.19	-0.32
1 Mar. 1968	26 Feb. to 7 Mar. 1968	4	6	0.63	2.08	1	1	29 Feb. 1968	Visual	1 Mar. 1968	1.83	11.00	1.88
13 Mar. 1968	7-13 Mar. 1968	6	0	0.45	1.48	0	1	12 Mar. 1968	Visual	8 Mar. 1968	-4.90	8.19	-2.33
22 Jan. 1969	13-22 Jan. 1969	9	0	0.38	1.26	0	3	21 Jan. 1969	Visual	20-25 Jan. 1969	-3.83	8.33	-12.64
10 Feb. 1969	5-12 Feb. 1969	5	2	0.51	1.66	0	1	9 Feb. 1969	Visual	9 Feb. 1969	-2.03	5.17	0.73
18 Feb. 1969	12-19 Feb. 1969	6	1	0.48	1.56	0	4	18 Feb. 1969	Visual	18-19 Feb. 1969	0.40	6.24	-5.48
2 Mar. 1969	26 Feb. to 5 Mar. 1969	4	3	0.75	2.46	3	10	2 Mar. 1969	Gage	27 Feb. to 3 Mar. 1969	6.99	8.65	-11.01
7 Mar. 1969	5-12 Mar. 1969	2	5	0.48	1.56	0	3	7 Mar. 1969	Gage	7-8 Mar. 1969	-3.43	7.17	5.10
11 Dec. 1969	20 Nov. to 16 Dec. 1969	21	5	No tide data	No tide data	---	---	-----	Visual	9 Dec. 1969	0.80	10.16	2.33
17 Dec. 1970	9-18 Dec. 1970 ²	8	1	0.91	3.00 ³	---	---	-----	Gage	17 Dec. 1970	3.60	10.14	-1.21
19 Feb. 1972	14-22 Feb. 1972	5	3	1.07	3.50	1	5	19 Feb. 1972	Visual	19 Feb. 1972	2.64	6.89	-14.83
22 Mar. 1973	16-25 Mar. 1973 ²	6	2	0.78	2.57	2	8	22 Mar. 1973	Visual	22 Mar. 1973	11.80	7.47	-11.60
AVG.		7.47	2.53	0.57	1.88	0.8	3						

¹ Simple average of profile values (negative values indicate recession-erosion).² Not all profiles reached MSL.³ Data from Sandy Hook, New Jersey.⁴ Data from Ludlum Island, New Jersey.

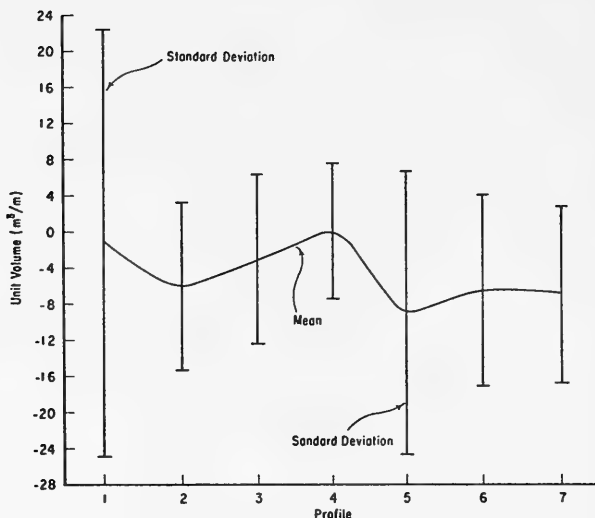


Figure 27. Mean and standard deviation of unit volume changes by profile for 17 selected storms at Atlantic City.

addition to having the smallest deviation of all profiles. Profile line 4, therefore, appears to maintain a reasonably stable unit volume throughout storms. This apparent anomaly may possibly be related to the number and type of structures near the profile; i.e., Steel Pier and Steeplechase Pier updrift of the profile, as well as two groins located on either side of Steel Pier (Table 1). In addition, another groin located just downdrift of the profile causes a "boxed-in" effect which could possibly contain a bulk of the littoral material.

Figure 28 illustrates the mean unit volume changes and standard deviations by contour above MSL for all profile lines during the selected storms. The greatest average unit volume loss occurs between the +0.5- and +1.0-meter contours. The figure also shows that the greatest deviations from the mean occur between the 0.0- and +2.0-meter contours. This is to be expected because wave action is concentrated in the foreshore region and thereby lends to greater variations in volumes of material moved. Also, it is possible that the maximum average unit volume loss occurs between the +0.5- and +1.0-meter contours because the average maximum surge above high water, which allows waves to concentrate, during those storms is 0.57 meter. Alternately, the variation in volume change generally decreases with increasing elevation above +2.0 meters because this part of the profile remains relatively stable, except in severe storms, due to its increased distance from the scouring effects of wave action. This higher part of the beach not only remains relatively stable, but it accretes an average of 0.21 cubic meter per meter per storm between the 3.0- and 3.5-meter contours.

Since losses from the lower contours clearly exceed gains along the upper contours, sand is moving either offshore or alongshore. The most intense storms resulted in -20 cubic meters per meter volume changes above MSL, which

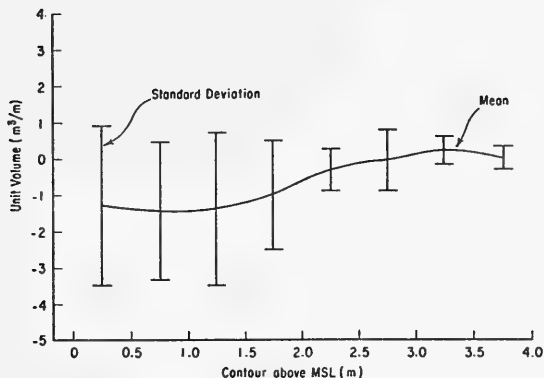


Figure 28. Mean and standard deviation of unit volume changes by contour for 17 selected storms at Atlantic City profile lines.

is -100,000 cubic meters over the 5-kilometer study area compared to the gross annual longshore transport rate of about 500,000 cubic meters (for the entire littoral zone); this short-term beach erosion indicates that most of the sediment transport during storms is offshore.

In Figure 29 the unit volume changes at each profile, as determined from prestorm and poststorm survey data, are compared to the changes in MSL shoreline position (0.0 contour) for the same storm data. In this way, volume changes resulting in accretion and erosion are compared to shoreline changes resulting in progression (advancement) and recession (retreat). Figure 30, which depicts trends in volume change versus shoreline change for selected storms, shows considerable differences between these two values, indicating, at least during storms, that volume accretion is not necessarily accompanied by MSL shoreline progression nor is volume erosion always accompanied by MSL shoreline recession. These data demonstrate the need for caution when evaluating short-term beach changes from aerial photos.

b. Beach-Fill Changes. Two major beach-fill projects at Atlantic City during the BEP study (in 1963 and 1970) used a combination of stockpiling and direct placement. Stockpiling entails periodically placing beach material at a concentrated updrift location in the depleted area, and allowing natural processes to move the fill downdrift to nourish the beach. Direct placement involves placing the fill along the entire area to be nourished.

As mentioned previously, the 1963 fill project consisted of 428,000 cubic meters of fill placed between Oriental and Virginia Avenues to replenish the greatly eroded beach resulting from the March 1962 storm. Figures 31 and 32 indicate the 1963 and 1970 beach-fill limits and the beach profiles before and after both fills. Figure 33 shows the unit volume change from 1963 to 1972 for each profile line. These data indicate that the 1963 fill remained for approximately 4 years on profile line 3 and provided nourishment to profile lines 4 to 7 at later times as a result of natural processes, as indicated by the dashline tracing volume increases along the profile lines. However, those same natural processes caused a continued erosion problem that required the

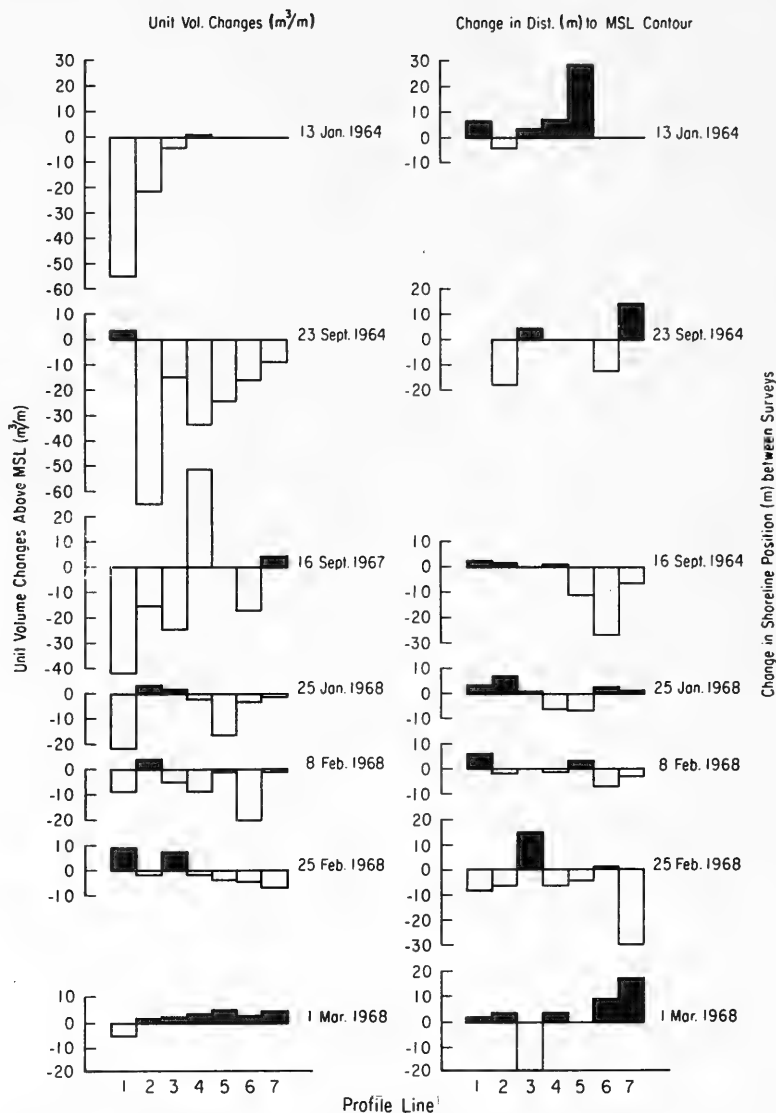


Figure 29. Comparison of unit volume changes and MSL shoreline position changes by profile for 17 selected storms.

Unit Vol. Changes (m^3/m)

Change in Dist. (m) to MSL Contour

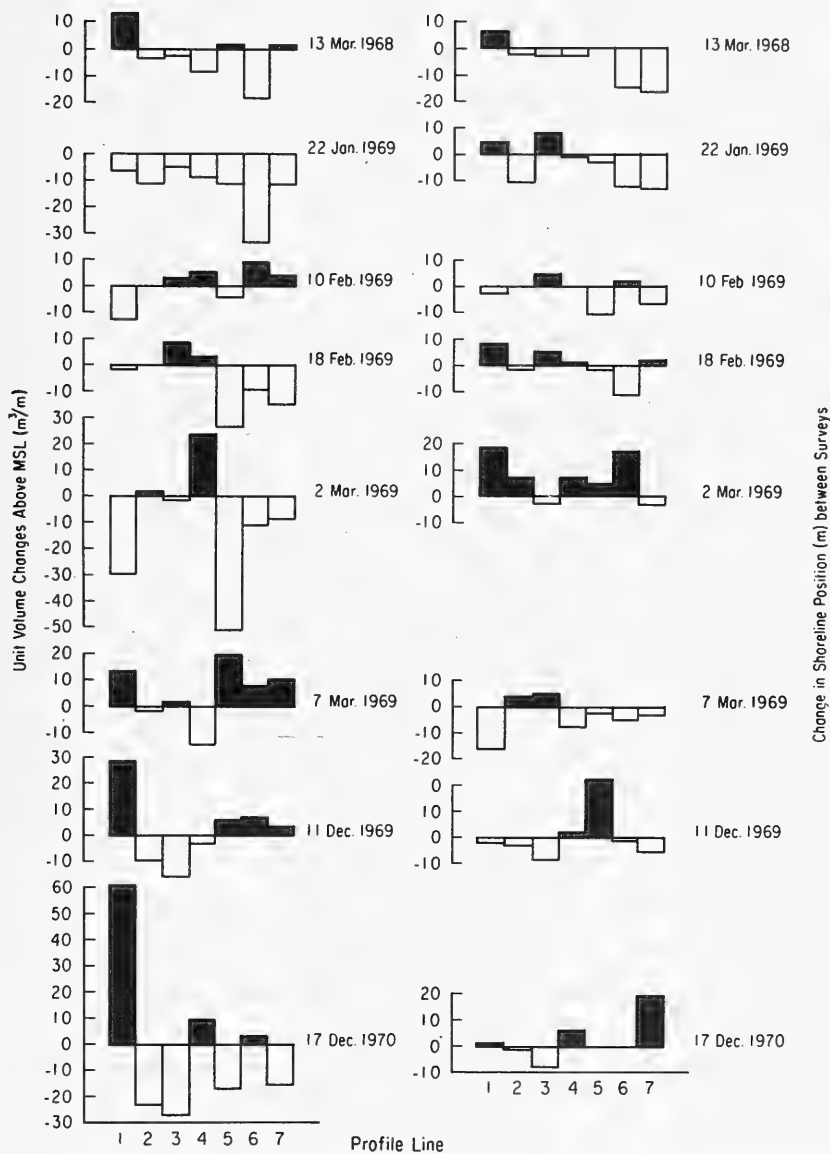


Figure 29. Comparison of unit volume changes and MSL shoreline position changes by profile for 17 selected storms.--Continued

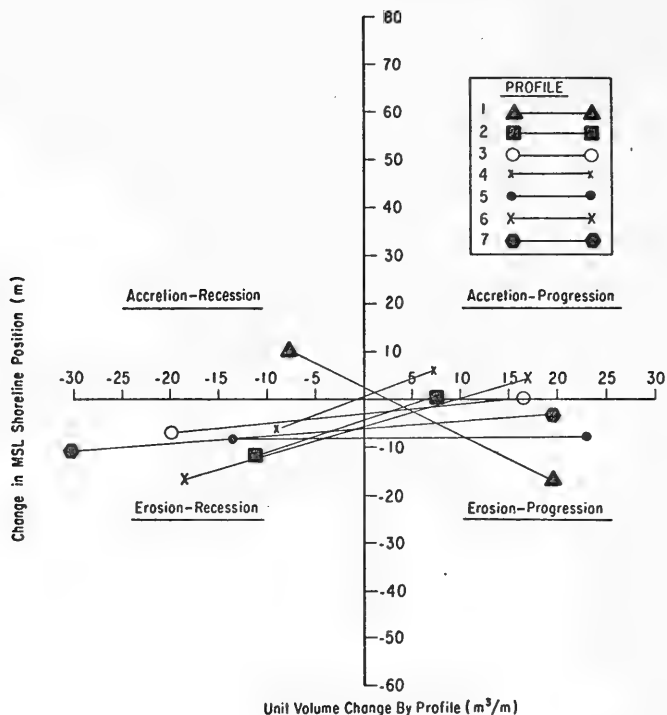


Figure 30. Trends in volume change versus shoreline change for 17 selected storms.

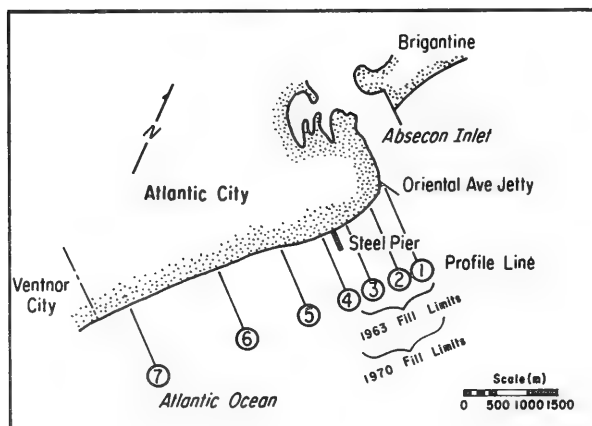


Figure 31. Limits of 1963 and 1970 beach fills at Atlantic City (Everts, DeWall, and Czerniak, 1974).

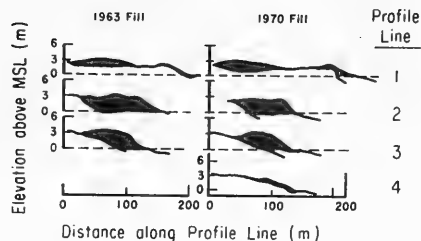


Figure 32. Cross section of beach from profiles taken before and after beach nourishment in 1963 and 1970 (from Everts, DeWall, and Czerniak, 1974).

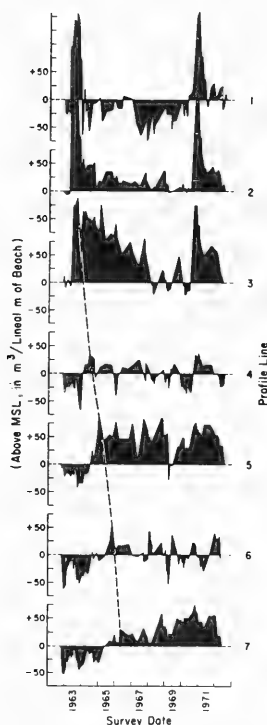


Figure 33. Sediment volume measurements between surveys relative to first survey ("zero" unit volume is the volume during the first survey in October 1962). Dashline indicates probable alongshore movement of some volume of the beach fill as determined by volume increases along profile lines 4 to 7 (Everts, DeWall, and Czerniak, 1974).

placement in 1970 of an additional 635,000 cubic meters of beach material between Oriental and Illinois Avenues (see Figs. 31 and 32). The fill material in each case was similar to the natural beach material, with a mean grain size of 0.3 millimeter. Again in 1970, profile line 3 indicated a trend to maintain much of the fill for an extended time period (Fig. 33). Although surveys were not conducted after 1973, it can be assumed that some of the fill migrated down the beach to the other profile lines as did some of the 1963 fill. Some information supporting this assumption is shown by comparing the photos in Figures 34 and 35 (taken in November 1970) with the photos in Figures 36, 37, and 38 (taken in March 1979 at profile line 2). Note the considerable amount of beach after the beach fill in 1970, compared to the practically nonexistent beach in 1979. Also, note the wide beach in Figure 39 (taken at profile line 6 in March 1979) compared to the lack of beach in Figures 36 and 37.



Figure 34. View of scarp just north of profile line 2 (24 November 1970).



Figure 35. View landward from waterline at profile line 2. Building at left, behind Boardwalk, is convalescent home shown in Figure 38 (24 November 1970).



Figure 36. View of groin at Vermont Avenue from under the Boardwalk at Rhode Island Avenue (profile line 2) (9 March 1979).

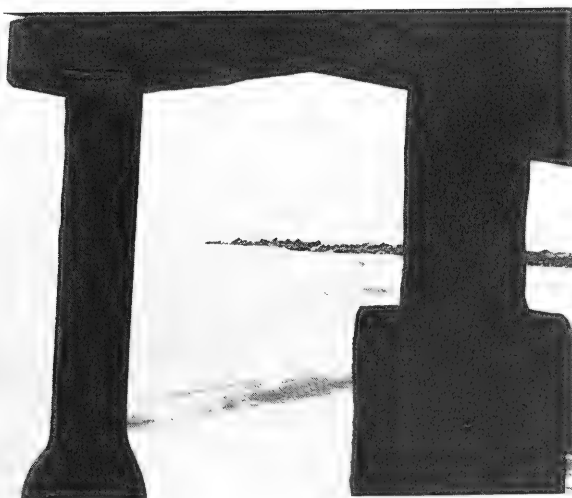


Figure 37. View of groin south of Rhode Island Avenue from under the Boardwalk at profile line 2 (9 March 1979).



Figure 38. View of erosion-scour at the base of the convalescent home on the south side of Rhode Island Avenue (8 March 1979).



Figure 39. Looking shoreward from waterline at California Avenue (profile line 6) on 9 March 1979. Note width of beach compared to that at profile line 2 in Figures 23 and 34.

Additional short-term changes that primarily affect the upper sections of the profiles result from the periodic removal of sand from under the Boardwalk (see Figs. 40, 41, and 42) for use as fill elsewhere on the beach (see Fig. 43). Although this procedure has been observed, it is not well documented in terms of frequency or quantities of material transferred. The project during the winter and spring of 1979 was done by the City and called for the removal of 36,600 cubic meters of sand from under the Boardwalk near profile line 7 (Richmond to Raleigh Avenues) (M. Ingram, City Engineer, personal communication, March 1979). This material was then placed on the foreshore midway between profile lines 4 and 5. Because of the relatively fine size of this well-sorted sand (0.18 millimeter compared with 0.27 millimeter reported by Ramsey and Galvin, 1977, for average foreshore sand size in March), the material would probably be easily eroded from the beach face.



Figure 40. Borrow site under Boardwalk at Richmond Avenue on 9 March 1979. Note amount of sand removed by comparison to sand still evident behind and under Boardwalk (compare also to Fig. 39).



Figure 41. Trucks waiting to be filled with sand near Raleigh Avenue (9 March 1979).



Figure 42. Front loader filling truck with sand excavated from under the Boardwalk near Raleigh Avenue (9 March 1979).



Figure 43. Site of beach fill near St. James and New York Avenues (9 March 1979).

2. Long-Term Changes.

Long-term changes include the cyclic seasonal changes (U.S. Army, Corps of Engineers, Coastal Engineering Research Center, 1977) along with longer range trends which may or may not be cyclic in nature. Changes in the MSL shoreline position during 1962-73 are shown in Figure 44. The 1963 and 1970 beach fills are evident on profile lines 1, 2, and 3 with subsequent progradation on the downdrift profiles, which was also shown in the unit volume changes (Fig. 33). Figure 45 depicts the average unit volume and MSL shoreline position by month for each of the profile lines. The mean of the monthly averages for each profile is indicated by the "zero" unit volume, whereas the "zero" MSL shoreline position is the shoreline position during the first survey. Figure 45 shows that seasonal changes do occur at Atlantic City, with the least volume of sand on the beach from January to March and the greatest volume of sand generally from June to August. This large quantity of sand also appears predominantly on profile lines 1, 2, and 3 with profile lines 5, 6, and 7 showing a loss of sand during June and July. These extremely large volumes at profile lines 1, 2, and 3 predominantly reflect the beach fill of 1963 in which the bulk of the fill material was placed along these profile lines as shown in Figure 32. These values may also be misleading since only four surveys were conducted in June and two in July throughout the 11-year study period, with each of the profile lines surveyed twice during June, July, and August of 1963 after the 1963 beach fill. June and July were the least surveyed months during the study period (Fig. 21). In addition, all profile lines were surveyed in August 1970 after the 1970 beach fill, thereby adding a bias to the six surveys conducted in August throughout the study. Therefore, the information for these months is less representative of average summer conditions.

To evaluate the entire Atlantic City locality as a whole, ΔS and ΔV were averaged by year in the alongshore direction. The averaged alongshore change in MSL shoreline, $\Delta \bar{S}$, is computed by summing the alongshore distance-weighted yearly average values of ΔS at each profile line and dividing by the total length of the study area. Similarly, the averaged alongshore change in storage volume, $\Delta \bar{V}$, is computed using the alongshore distance-weighted values of ΔV (Czerniak, 1974).

A comparison of the mean yearly changes in storage volume and MSL shoreline (Fig. 46) shows that the long-term trends are influenced more by the *magnitude* of the accretion-erosion and progression-recession occurring in these years than by the *number* of net accretionary or erosional years. This is clearly indicated by the high dependency on the two artificial beach fills in 1963 and 1970 for the shape of the cumulative yearly change in storage volume, $\Delta \bar{V}$ (Fig. 46). In conjunction with this, yearly changes in the MSL shoreline and storage volume vary considerably and appear to suggest no clear pattern.

Figure 47 shows the changes in unit volume and shoreline position for the years between the beach nourishment projects in 1963 and 1970. The slope of a least square fit line drawn through the points on the plot of cumulative average yearly change in storage volume for the seven profile lines (Fig. 47) provides a single number which best describes the rate of "natural" change in the above MSL storage volume during this period. The line only provides a general description of the trend in the data due to the wide yearly variation

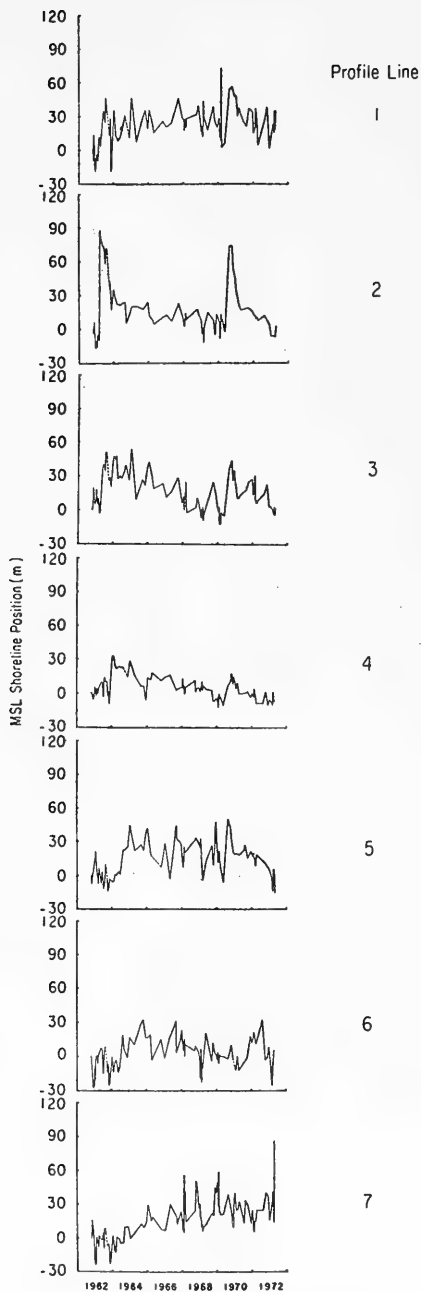


Figure 44. MSL shoreline changes in time (missing data shown by dashline).

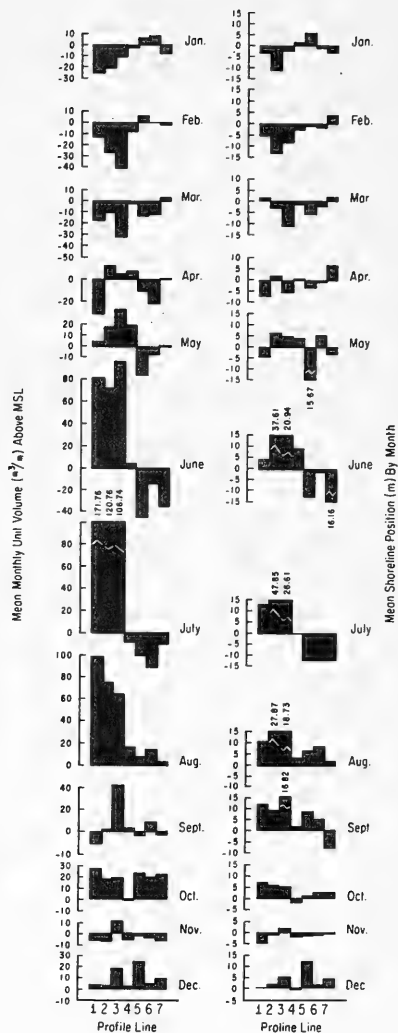


Figure 45. Mean above MSL unit volume changes and MSL shoreline position changes by month (24 October 1962 to 1 May 1973).

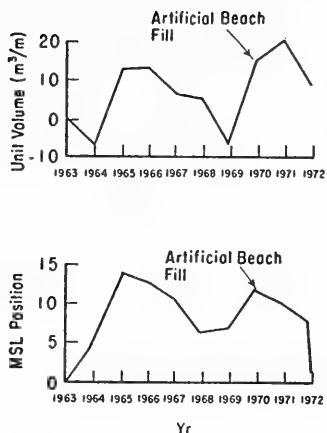


Figure 46. Cumulative yearly change in unit volume and MSL shoreline at Atlantic City.

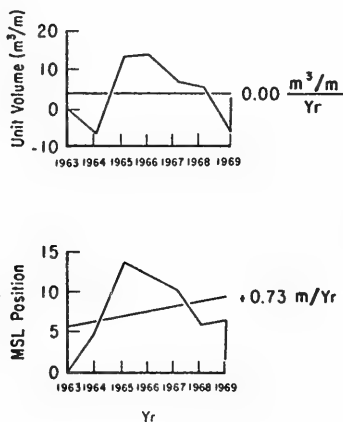


Figure 47. Long-term changes in unit volume and MSL shoreline from 1963-69 to eliminate effects of 1970 beach fill.

(Fig. 33). Under these conditions, Figure 47 indicates that Atlantic City has remained stable at 0.00 cubic meter per meter per year change above MSL during the period from 1963 to 1969.

Applying the same procedure to the change in MSL shoreline over the same period, the rate of change in the MSL shoreline indicates a progression of 0.73 meter per year. However, this line likewise represents only a general trend and only roughly approximates the actual rates of change in MSL shoreline for the locality.

Further information on the MSL shoreline changes and the above MSL unit volume changes through time by profile line is provided in Appendixes D and E, which are large-scale figures by profile of Figures 44 and 33, respectively.

V. DISCUSSION

1. Profile Changes.

In a study by the Beach Erosion Board (1950), various shoreline positions from 1841 to 1947 were compared to determine a trend in shoreline advance and retreat along the beaches at Atlantic City. It was found that considerable shoreline retreat occurred at the inlet entrance from 1841 to 1936. After 1936 the inlet shoreline remained reasonably stable due to the installation of protective structures such as bulkheads and groins. The greatest natural change at the inlet entrance from 1936 to 1947 was a progressive lowering of the beach.

The ocean shoreline beginning 300 meters northeast of Garden Pier and extending 1.2 kilometers southwest to Central Pier receded between 1936 and 1947 with a greatly accelerating rate after 1939 (Fig. 48). After the placement of a beach fill in 1948, from July 1948 to August 1960, the shoreline between the Oriental Avenue jetty and New Hampshire Avenue experienced progression ranging from a maximum of about 52 meters at the jetty to about 6 meters at New Hampshire Avenue. During this same period the shoreline between New Hampshire Avenue and Steel Pier receded, with few exceptions, from a maximum of about 40 meters between Vermont and Rhode Island Avenues to a maximum of 3 meters in the region east of Steel Pier. The recession between Vermont and Rhode Island Avenues duplicated the shoreline position of 1936 (Fig. 48).

Surveys in July and October 1948, February and May 1949, January 1950, December 1958, August 1959 and 1960, and March 1962 provide detailed profile data for the area between the Oriental Avenue jetty and Steel Pier (U.S. Congress, 1964b). There are no indications, from the previous data, of any definite quantitative trends in volumetric changes along this reach extending from the Boardwalk to approximately 1.8 meters below MLW. Likewise, for the 11-year BEP study, there appears to be no clearly defined trend in volumetric changes throughout the seven selected profiles. The two most significant events are the 1963 and 1970 beach fills and the natural transport of that material downdrift, as shown in Figure 33.

Figure 49 depicts four sets of profiles of the beach and offshore regions from January 1936 to February 1948 (before the 1948 beach fill). These profiles indicate that relative stability increases with distance southwest from the Oriental Avenue jetty and Absecon Inlet.

Profile envelopes for each profile line throughout the study period (App. F) depict the entire range of maximum and minimum elevations surveyed at given distances along the profile line and do not appear to indicate any clear trend to greater stability from profile line 1 to profile line 7.

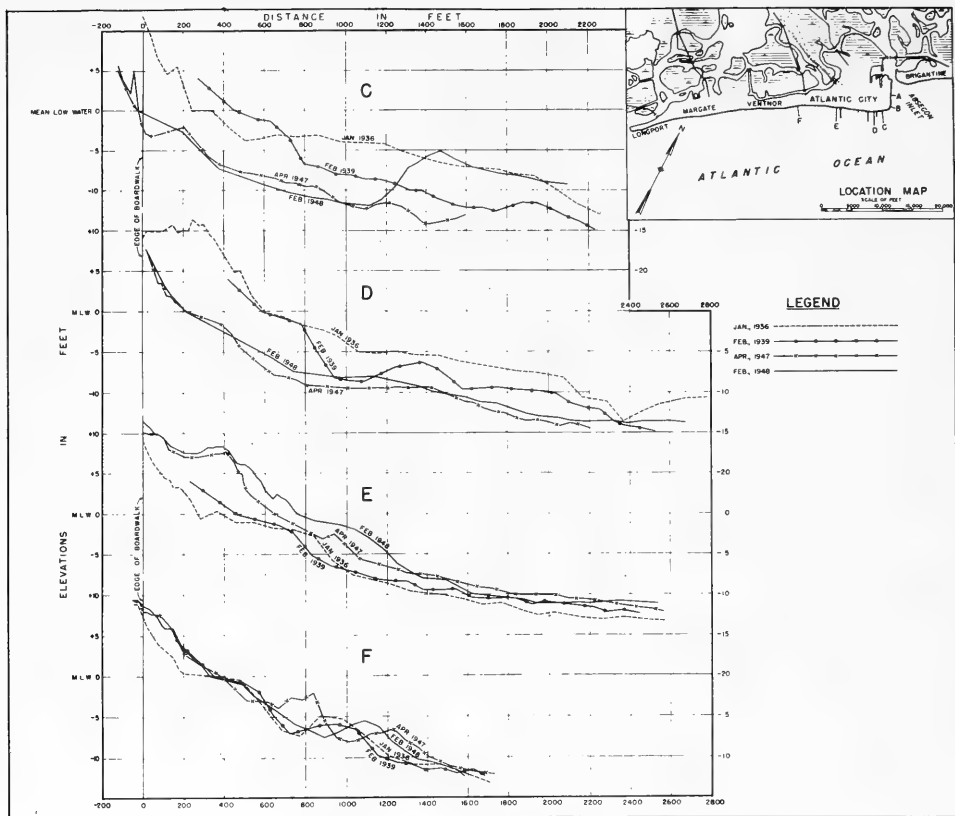


Figure 49. Profile changes along Atlantic City, 1936-48 (Beach Erosion Board, 1950).

2. Seasonal Changes and Wave Climate.

Figure 50 combines mean monthly wave height and period information obtained from Atlantic City and the Toms River Coast Guard Station (Fig. 1) for comparison. Of these sources, the gage data are considered more reliable although the visual observations provide important nearshore wave direction information. The gage data (Thompson and Harris, 1972) were obtained from 7-minute pen-and-ink records taken six times daily from a 7.62-meter relay-type gage located on the seaward end of Steel Pier. The visual observations (made by local volunteers) include estimations of nearshore wave period, height, direction, and breaker type. The Cooperative Surf Observation Program (COSOP) data were also obtained visually by cooperating personnel from U.S. Coast Guard Stations at Atlantic City and Toms River. As shown in Figure 50, there is considerable variation between these sources of wave data.

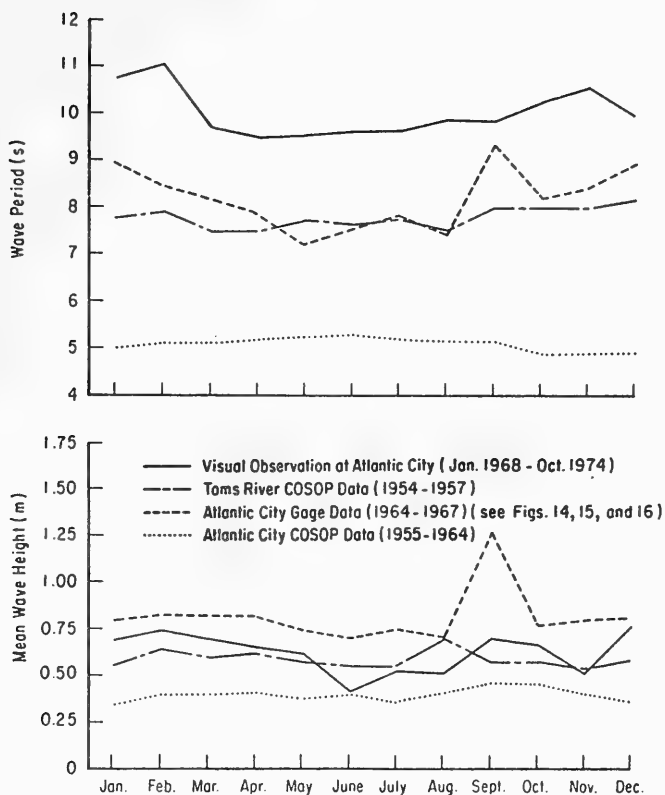


Figure 50. Mean monthly gage and visual data for wave heights and periods for Atlantic City.

The visual observation data indicate that the breaker approach is predominantly from within a sector of 5° to the left of shore-normal to an observer on the beach.

3. Coastal Engineering Implications.

The data in this study largely indicate the far-reaching influence of the two beach fills of 1963 and 1970. Judging from the volumetric and MSL shore-line changes through time, shown in Figures 33 and 44, respectively, the beach fills accomplished their purpose of rebuilding the beach, not only where the fill was directly placed, but also downdrift, as the result of natural littoral processes. The severe erosional condition at profile line 2, however, bears closer examination to determine the specific causes as well as possible solutions to this critical problem.

Among the greatest difficulties in determining how and where the sand is transported are the incomplete surveying of the entire Absecon Island and the

relatively shallow surveying out to only 2 feet below MSL. Therefore, the amount of sand transported offshore or alongshore to the southwest cannot be determined. To better understand the complex and dynamic sediment movement in this area, and thereby arrive at a functional solution, the entire island should be studied as a complete system from Absecon Inlet to Great Egg Harbor Inlet. This would enable a more reliable description of the processes involved along this coastline. More information should also be obtained relating to the processes of the inlets at both ends of the island to enhance the understanding of the impact these inlets have on Absecon Island.

Prestorm and poststorm surveys played an important role in understanding some of the storm-related processes taking place along this coast. Additional surveys of this type would significantly increase the awareness of just how much sand is moved and where during storms, which would then enable the area to plan accordingly before the storm season. Again, this points out the need to survey farther offshore to locate where some of the sand is being transported.

The implications of the beach-fill project in March 1979 indicate the need for careful planning of the time, location, and grain size of the fill material when undertaking such a project. The grain size of the fill material taken from under the Boardwalk for this project was much smaller than the median grain size of the beach material in the vicinity of the nourishment project. This factor, in conjunction with the time of year (March being a highly susceptible time for storm waves), resulted in most of the fill being washed away almost immediately on placement, according to a bulldozer operator on the site. This beach-fill project, then, appeared to be much less successful than the two fills conducted in 1963 and 1970.

VI. SUMMARY

Each of the seven profile lines at Atlantic City, spaced from a minimum of 467 meters to a maximum of 1.62 kilometers apart, was surveyed a minimum of 118 times, generally from the seaward edge of the Boardwalk to wading depth. Frequency of surveys ranged from weekly to quarterly (Figs. 20 and 21). During the study there were 17 reasonably well-documented storms with prestorm and poststorm surveys (Table 5).

The study area extends 5 kilometers southwest from the Absecon Inlet jetty and is comprised of 0.27-millimeter median grain-size quartz sand. The shore slope ranges from 0.039 to 0.066 with an average of 0.047 over the seven profile lines. The berm width, measured from the Boardwalk, extends between 5 meters at profile line 2 and 180 meters at profile line 1 with an overall average of 80 meters. The average berm elevation above MSL is 2.2 meters with a range between 1.3 and 3.0 meters.

Winds are generally out of the southwest quadrant with mean speeds ranging from 20 to 45 kilometers per hour (Figs. 9, 10, and 11). The mean significant wave height is 0.81 meter with a mean wave period of 8.18 seconds consisting predominantly of plunging waves. The area also has a mean tidal range of 1.2 meters.

Among the largest natural changes measured between surveys at a single profile line were a volume loss of 51.39 cubic meters per meter during the

storm of 2 March 1969 at profile line 5 and a shoreline recession of 30.18 meters during the 25 February 1968 storm at profile line 7. Storm changes (Fig. 30) indicate no clear correlation between shoreline recession and erosion, as might be expected. For example, during the 2 March 1969 storm, the average shoreline accreted 6.99 meters, whereas the average above MSL unit volume eroded 11.01 cubic meters per meter. However, profile line 2 shows the most critical erosion, as shown in Figures 36, 37, and 38.

Major beach-fill projects were completed in 1963 and 1970, introducing approximately 428,000 and 635,000 cubic meters of fill material, respectively, to the northern end of the study area (see Fig. 31). These fills were reasonably successful in nourishing the beach, as shown in Figure 33.

Seasonal changes are indicated with a maximum volume of sand above MSL from May through October (Fig. 45). The net volume change above MSL along the beach, disregarding the 1970 beach fill, is near zero. Although the beach, as a whole, experienced a near zero net change during the period 1963-69, there was a shift of beach storage volume from the 1963 fill site on the northern end of the study area toward the southwest, along the beach (Fig. 33). This shift of beach volume was expected with time and resulted in an effective beach-fill project.

In conclusion, this study was extremely valuable for the quantitative determination of some of the shore processes taking place at Atlantic City as well as to indicate how such studies may be accomplished more effectively and efficiently in the future.

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APPENDIX A

PROFILE LINE DOCUMENTATION

The station description forms in this appendix provide a summary of all data needed to recover or reestablish a survey point.

The horizontal and vertical control was first established when Atlantic City was surveyed for the Storm Warning Program, the forerunner of the Beach Evaluation Program. Most of the bronze disks were placed on the profile lines in 1975; a few were placed in 1976. All survey work was done by the U.S. Army Engineer District, Philadelphia. The given elevations are referenced to sea level datum.

The data on these forms are subject to change due to the reestablishment of survey points, or the updating of culture shown. CERC should be contacted for any updating of these data.

COUNTRY U.S.A.	TYPE OF MARK Standard Bronze Disk	STATION BE-A Sta. 0+00	Profile line 1
LOCALITY Atlantic City, NJ	STAMPING ON MARK BE-A 0+00	AGENCY (CAST IN MARKS) Corps of Engrs.	ELEVATION (FT) 7.20 7.20
LATITUDE 39°21'57.72"	LONGITUDE 74°24'36.57"	DATUM	DATUM S.L.D. 1929
(NORTHING)(EASTING) 194 120	(EASTING)(NORTHING) 2 072 524	GRID AND ZONE NJ Trans Merc.	ESTABLISHED BY (AGENCY) Corps of Engineers
(NORTHING)(EASTING) (M)	(EASTING)(NORTHING) (M)	GRID AND ZONE	DATE 19 Nov 75

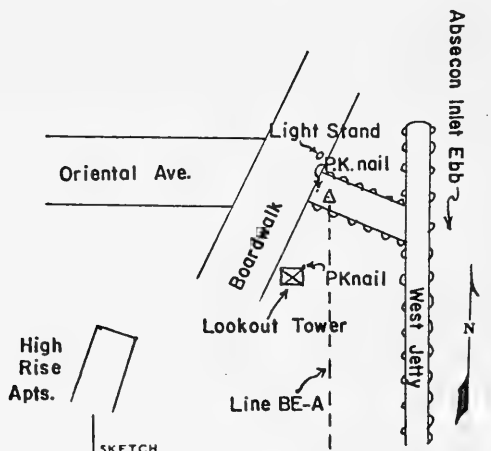
TO OBTAIN	GRID AZIMUTH, ADD	TO THE GEODETIC AZIMUTH
TO OBTAIN	GRID AZ. (ADD)(SUB.)	TO THE GEODETIC AZIMUTH

OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)

The station is located in Atlantic City, NJ at the east end of Oriental Avenue, and the north end of the west jetty of Absecon Inlet; 52.04 feet north of PK (elevation 7.58') nail in the lower end of diagonal brace under the NE corner of Coast Guard Lookout Tower; 11.69 feet east of NE corner of light stand on east side of boardwalk; 10.0 feet east of east side of boardwalk; 9.97 feet east of a PK nail in vertical side of the east stringer of boardwalk on centerline of Oriental Avenue extended; 3.0 feet north of centerline of stone groin, and 1.0 feet south of centerline Oriental Avenue extended.

The station is marked by a standard disk grouted into the top of stone groin.

NJ Grid Azimuth of Line BE-A 321°-30'



DA FORM 1959
1 OCT 64

REPLACES DA FORMS 1959
AND 1960, 1 FEB 57, WHICH
ARE OBSOLETE.

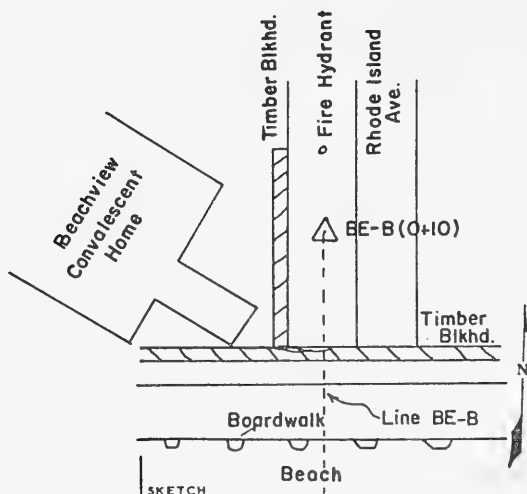
DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION
For use of this form, see TM 5-237; the proponent
agency is U.S. Continental Army Command.

COUNTRY U. S. A.		TYPE OF MARK Standard Bronze Disk		STATION BE-B Sta. 0+10 Profile line 2	
LOCALITY Atlantic City, NJ		STAMPING ON MARK BE-B 0+10		AGENCY (CAST IN MARKS) Corps of Engrs.	
LATITUDE 39° 21' 44.56"		LONGITUDE 74° 24' 46.26"		ELEVATION 8.03 (FT)	
(NORTHING)(EASTING) 192 786		(EASTING)(NORTHING) 2 071 767		ESTABLISHED BY (AGENCY) Corps of Engineers	
(NORTHING)(EASTING) (M)		(EASTING)(NORTHING) (M)		DATE 19 Nov 75	
TO OBTAIN		GRID AZIMUTH, ADD		TO THE GEODETTIC AZIMUTH	
TO OBTAIN		GRID AZ. (ADD)(SUB.)		TO THE GEODETTIC AZIMUTH	
OBJECT	AZIMUTH OR DIRECTION (GEODETTIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS)	GRID DISTANCE (METERS)	(FEET)

The station is located in Atlantic City, NJ on the west sidewalk of Rhode Island Avenue; 130.40 feet north of a square cut in the top of concrete reinforcement on south side of boardwalk of Rhode Island Avenue (elevation 12.43'); 53.86 feet east of inner corner of Beachview convalescent home building; 48.5 feet north of a timber bulkhead at the ocean end of avenue; 39.97 feet NE of outer corner of Beachview convalescent home building; 10.00 feet south of top of fire hydrant and 1.5 feet west of the west curb of Rhode Island Avenue.

Station is marked by a standard disk grouted flush with sidewalk.

NJ Grid Azimuth of Line. BE-B 332°-18'



DA FORM 1959

REPLACES DA FORMS 1959
AND 1960, 1 FEB 57, WHICH
ARE OBSOLETE.

DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION
For use of this form, see TM 5-237; the proponent
agency is U.S. Continental Army Command.

COUNTRY U. S. A.	TYPE OF MARK Standard Bronze Disk		STATION BE-C Sta. (-)2+00 20' west		Profile line 3
LOCALITY Atlantic City, NJ	STAMPING ON MARK BE-C -2+00 20'W		AGENCY (CAST IN MARKS) Corps of Engineers		ELEVATION (FT) 7.85
LATITUDE 39°21'36.91"	LONGITUDE 74°25'04.15"		DATUM		DATUM S.L.D. 1929
(NORTHING)(EASTING) 192 008	(FT) XXXX	(EASTING)(NORTHING) 2 070 364	(FT) XXXX	GRID AND ZONE NJ Trans Merc.	ESTABLISHED BY (AGENCY) Corps of Engineers
(NORTHING)(EASTING) (M)	(FT) (M)	(EASTING)(NORTHING) (FT) (M)	(FT) (M)	GRID AND ZONE	DATE 19 Nov 75

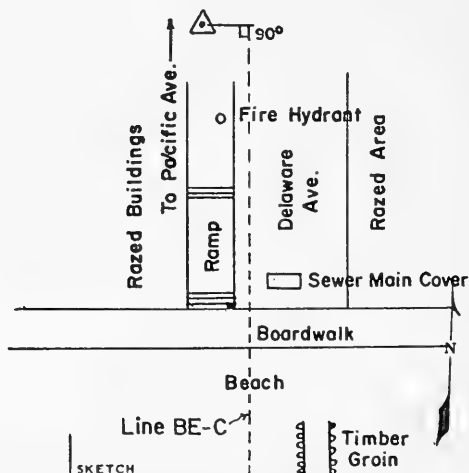
TO OBTAIN GRID AZIMUTH, ADD TO THE GEODETIC AZIMUTH
TO OBTAIN GRID AZ. (ADD)(SUB.) TO THE GEODETIC AZIMUTH

OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)

The station is located in Atlantic City, NJ on the west side of Delaware Avenue in an area due for redevelopment; 45.23 feet north of south west corner of sewer main cover; 32.25 feet north of a fire hydrant; 4.92 feet west of a PK nail in the seam of west curb of Delaware Avenue.

Station is marked by a standard disk grouted flush into sidewalk, and is 20' west of profile line.

NJ Grid Azimuth of Line BE-C 333°-26'



DA FORM 1959

REPLACES DA FORMS 1959
AND 1960, 1 FEB 57, WHICH
ARE OBSOLETE.

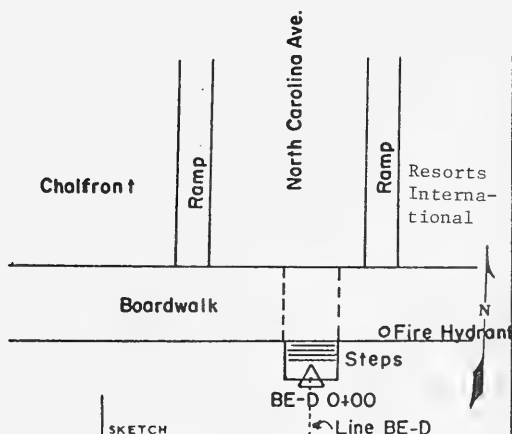
DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION
For use of this form, see TM 5-237; the proponent
agency is U.S. Continental Army Command.

COUNTRY U. S. A.		TYPE OF MARK Standard Bronze Disk		STATION BE - D Sta. 0+00 Profile line 4	
LOCALITY Atlantic City, NJ		STAMPING ON MARK BE-D 0+00		AGENCY (CAST IN MARKS) Corps of Engrs.	
LATITUDE 39°21'27.78"		LONGITUDE 74°25'20.50"		ELEVATION (FT) 10.71	
(NORTHING)(EASTING) 191 081		(EASTING)(NORTHING) 2 069 082		DATUM S.L.D. 1929	
(NORTHING)(EASTING) (M)		(EASTING)(NORTHING) (M)		ESTABLISHED BY (AGENCY) Corps of Engineers	
TO OBTAIN		GRID AZIMUTH, ADD		TO THE GEODETIC AZIMUTH	
TO OBTAIN		GRID AZ. (ADD)(SUB.)		TO THE GEODETIC AZIMUTH	
OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)	

Station is located in Atlantic City, NJ at the beach (south) end of North Carolina Avenue, under the boardwalk; 87.88 feet south east of the SE corner of Chalfont Building, 72.29 feet south west of SW corner of Resorts International; 29.52 feet southwest of the top center bolt of fire hydrant.

Station is marked by a standard disk grouted flush into the top step of a pedestrian ramp.

NJ Grid Azimuth of Line BE-D 332°-01'



DA FORM 1959 REPLACES DA FORMS 1959 AND 1960, 1 FEB 57, WHICH ARE OBSOLETE.

DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION For use of this form, see TM 5-237; the proponent agency is U.S. Continental Army Command.

COUNTRY U. S. A.		TYPE OF MARK Standard Bronze Disk		STATION BE-E (-)2+75 20' west Profile line 5	
LOCALITY Atlantic City, NJ		STAMPING ON MARK BE-E -2+75 20'W		AGENCY (CAST IN MARKS) Corps of Engrs.	
LATITUDE 39°21'22.90"		LONGITUDE 74°25'52.27"		ELEVATION 6.56 (FT) XXXX	
(NORTHING)(EASTING) 190 580		(EASTING)(NORTHING) 2 066 588		DATUM S.L.D. 1929	
(NORTHING)(EASTING) (M)		(EASTING)(NORTHING) (M)		ESTABLISHED BY (AGENCY) Corps of Engineers	
				DATE 24 Aug 76	
				ORDER	

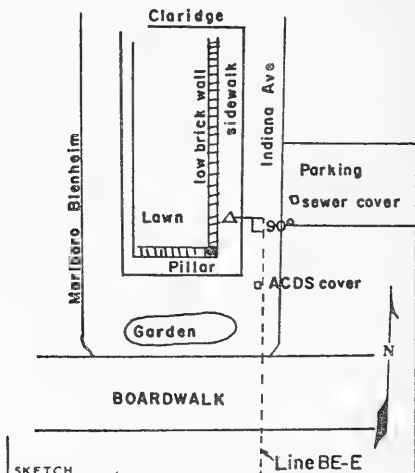
TO OBTAIN	GRID AZIMUTH, ADD	TO THE GEODETIC AZIMUTH
TO OBTAIN	GRID AZ. (ADD)(SUB.)	TO THE GEODETIC AZIMUTH

OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)

Station is located in Atlantic City, NJ on the west side of Indiana Avenue, south of the Claridge Hotel, 49.60 feet west of the SE corner of sewer cover on the east side of Indiana Avenue; 18.79 feet north west of the NW corner of A.C.D.S. cover, just west of the centerline of street, and 12.85 feet north east of top center of pillar on NE side of steps leading to lawn.

Station is marked by a standard disk grouted flush into sidewalk, and is 20' west of profile line.

NJ Grid Azimuth of Line BE-E 332°-36'



DA FORM 1959
1 OCT 64

REPLACES DA FORMS 1959
AND 1960, 1 FEB 57, WHICH
ARE OBSOLETE.

DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION
For use of this form, see TM 5-237; the proponent
agency is U.S. Continental Army Command.

COUNTRY U. S. A.	TYPE OF MARK Standard Bronze Disk	STATION BE-F Sta. (-) 0+75 Profile line 6	
LOCALITY Atlantic City, NJ	STAMPING ON MARK BE-F -0+75	AGENCY (CAST IN MARKS) Corps of Engrs.	ELEVATION 5.20 (FT) 700
LATITUDE 39°21'08.93"	LONGITUDE 74°26'34.43"	DATUM	DATUM S.L.D. 1929
(NORTHING)(EASTING) 189 159	(EASTING)(NORTHING) 2 063 280	GRID AND ZONE NJ Trans Merc.	ESTABLISHED BY (AGENCY) Corps of Engineers
(NORTHING)(EASTING) (M)	(EASTING)(NORTHING) (M)	GRID AND ZONE	DATE 19 Nov 75

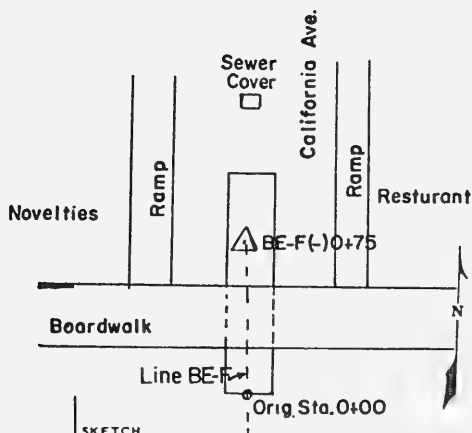
TO OBTAIN	GRID AZIMUTH, ADD	TO THE GEODETIC AZIMUTH
TO OBTAIN	GRID AZ. (ADD)(SUB.)	TO THE GEODETIC AZIMUTH

OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS)	GRID DISTANCE (METERS)	(FEET)

Station is located in Atlantic City, NJ under the boardwalk at the ocean, or south end of California Avenue, 49.38 feet south of the SE corner of sewer cover, just west of centerline of California Avenue, 12.0 feet SW of NE corner of east wall for ramp, 8.08 SE of the NW corner of west wall and 1.3 feet east of W. wall.

Station is marked by a standard disk grouted flush with surface of a pedestrian ramp.

NJ Grid Azimuth of Line BE-F 332°-55'

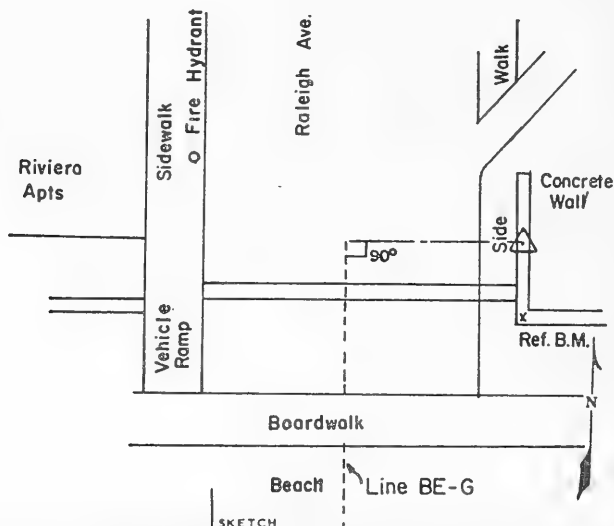


COUNTRY U. S. A.		TYPE OF MARK Standard Bronze Disk		STATION. BE-G Sta. (-) 0+75 25.5' East		Profile line 7	
LOCALITY Atlantic City, NJ		STAMPING ON MARK BE-G -0+75 25.5' E		AGENCY (CAST IN MARKS) Corps of Engrs.		ELEVATION (FT) 11.64	
LATITUDE 39°20'45.28"		LONGITUDE 74°27'34.82"		DATUM		DATUM S.L.D. 1929	
(NORTHING)(EASTING) (FT)		(EASTING)(NORTHING) (FT)		GRID AND ZONE		ESTABLISHED BY (AGENCY)	
186 754		2 058 542		NJ Trans Merc		Corps of Engineers	
(NORTHING)(EASTING) (FT)		(EASTING)(NORTHING) (FT)		GRID AND ZONE		DATE ORDER	
						27 Aug 76	
TO OBTAIN				GRID AZIMUTH, ADD			
TO OBTAIN				GRID AZ. (ADD)(SUB.)			
				TO THE GEODETIC AZIMUTH			
				TO THE GEODETIC AZIMUTH			
OBJECT		AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)		BACK AZIMUTH		GEOD. DISTANCE (METERS) (FEET)	
						GRID DISTANCE (METERS) (FEET)	

The station is located in Atlantic City, NJ on the east side of south (ocean) end of Raleigh Avenue; 52.59' south of north end of concrete wall; 44.31 feet southeast of fire hydrant; 38.20 feet north of reference B.M. which is a square cut in the southwest corner of concrete wall (elevation 11.52); and 11.0 feet east of east curb of Raleigh Avenue.

Station is marked by a standard disk grouted flush in concrete wall on east side of Raleigh Avenue, and is 25.5' east of profile line.

NJ Grid Azimuth of Line BE-G 328°-14'



DA FORM 1959
1 OCT 64

REPLACES DA FORMS 1959
AND 1960, 1 FEB 57, WHICH
ARE OBSOLETE.

DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION
For use of this form, see TM 5-237; the proponent
agency is U.S. Continental Army Command.

APPENDIX B

PROFILE LINE SURVEY DATA

The survey data for the Atlantic City beach study are tabulated by profile line number and survey date (in the form YRMODA). Distances are in feet from the profile line bench mark; elevations are in feet above MSL.

DATE 630523	DATE 630611	DATE 630626	DATE 630712	DATE 630724	DATE 630807	DATE 630823	DATE 630905
SRVY 17	SRVY 1A	SRVY 19	SRVY 20	SRVY 21	SRVY 22	SRVY 23	SRVY 24
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
19. 0.4	0. 7.1	200. 9.2	7.1 1.1	50. 6.6	0. 7.1	0. 7.1	350. 6.7
26. 7.6	12. 7.1	250. 18. 14.	14. 6.5	100. 7.8	12. 7.1	5. 6.2	400. 5.2
150. 9.3	15. 6.5	300. 7.0 13.	6.5 6.1	150. 9.1	15. 6.5	10. 5.2	450. 5.5
250. 6.8	150. 7.6	350. 5.3 10.	6.1 6.1	200. 8.6	15. 6.5	15. 5.0	500. 5.4
300. 7.3	150. 9.1	400. 5.0 9.0	9.0 6.0	250. 8.6	20. 9.1	20. 8.9	550. 5.4
350. 7.3	200. 9.2	450. 5.4 9.4	9.0 6.0	300. 7.3	25. 8.8	25. 8.5	600. 5.3
351. 6.9	250. 8.8	500. 5.4 9.4	9.0 6.0	350. 7.3	30. 9.0	30. 7.3	650. 5.0
400. 6.3	300. 8.8	550. 5.1 9.1	8.5 6.5	400. 6.5	35. 8.8	35. 6.7	700. 2.9
450. 5.9	350. 6.6	600. 4.7 9.4	6.7 6.7	450. 5.9	40. 7.8	40. 6.1	750. 1.9
500. 5.3	400. 6.2	650. 4.0 9.1	5.9 6.0	500. 5.2	45. 6.0	45. 5.2	
550. 5.3	450. 5.5	690. 4.8 8.9	5.3 5.3	550. 5.2	50. 5.5	50. 5.2	
600. 4.6	500. 5.4	702. 0.8 9.0	5.3 5.3	600. 5.2	55. 5.2	55. 5.1	
626. 4.1	550. 5.2	751. 0.8 8.1	5.3 5.3	625. 5.4	60. 5.3	60. 5.3	
651. 3.3	575. 5.2	801. 0.1 8.1	4.9 7.0	650. 2.2	65. 5.2	65. 4.8	
700. 1.3	601. 4.7		4.3 6.2	675. 1.8	70. 5.1	70. 4.8	
725. 2.2	651. 2.9		6.2 7.5	725. 1.9	75. 4.9	75. 4.3	
801. 1.0	701. 1.4		7.5 7.5	775. 0.7	80. 4.8	80. 3.8	
825. 0.8	751. 0.8		7.5 7.5	851. 0.7	85. 4.2	85. 3.8	
	775. 0.0		7.5 7.5	875. 0.7	90. 4.2	90. 3.8	
	825. 1.0				95. 4.2	95. 3.8	

DATE 630925	DATE 631009	DATE 631026	DATE 631116	DATE 631231	DATE 640117	DATE 640214	DATE 640312
SRVY 25	SRVY 12A	SRVY 27	SRVY 2A	SRVY 29	SRVY 30	SRVY 31	SRVY 32
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
0. 7.2	60. 1.5	9.0 2.1	10.5 1.5	15. 6.2	0. 7.0	0. 7.0	0. 7.0
14. 7.1	65. 1.5	201. 2.1	7.5 1.5	50. 6.5	21. 4.9	21. 4.9	22. 4.9
15. 6.4	70. 1.0	301. 3.1	0. 0.9	76. 6.6	31. 5.1	31. 5.1	32. 5.1
25. 5.8	75. 0.8	352. 3.2	1.4 0.9	101. 6.7	41. 5.2	41. 5.2	42. 5.2
30. 7.0	80. 0.8	403. 4.0	2.5 1.5	127. 5.0	51. 5.3	51. 5.3	52. 5.3
35. 6.8	85. 0.8	454. 4.8	4.5 2.5	151. 5.9	61. 5.4	61. 5.4	62. 5.4
132. 5.3	90. 0.8	505. 5.0	6.8 3.1	176. 4.8	71. 5.5	71. 5.5	72. 5.5
202. 6.8	100. 0.0	556. 4.3	9.1 3.1	201. 4.8	81. 5.6	81. 5.6	82. 5.6
245. 6.7	110. 0.0	607. 4.3	11.1 3.1	226. 4.8	91. 5.7	91. 5.7	92. 5.7
288. 6.7	120. 0.0	658. 4.3	13.1 3.1	251. 4.8	101. 5.8	101. 5.8	102. 5.8
305. 6.7	130. 0.0	709. 4.3	15.1 3.1	276. 4.8	111. 5.9	111. 5.9	112. 5.9
322. 6.7	140. 0.0	760. 4.3	17.1 3.1	301. 4.8	121. 6.0	121. 6.0	122. 6.0
339. 6.7	150. 0.0	811. 4.3	19.1 3.1	326. 4.8	131. 6.1	131. 6.1	132. 6.1
356. 6.7	160. 0.0	862. 4.3	21.1 3.1	351. 4.8	141. 6.2	141. 6.2	142. 6.2
373. 6.7	170. 0.0	913. 4.3	23.1 3.1	376. 4.8	151. 6.3	151. 6.3	152. 6.3
390. 6.7	180. 0.0	964. 4.3	25.1 3.1	401. 4.8	161. 6.4	161. 6.4	162. 6.4
407. 6.7	190. 0.0	1015. 4.3	27.1 3.1	426. 4.8	171. 6.5	171. 6.5	172. 6.5
424. 6.7	200. 0.0	1066. 4.3	29.1 3.1	451. 4.8	181. 6.6	181. 6.6	182. 6.6
441. 6.7	210. 0.0	1117. 4.3	31.1 3.1	476. 4.8	191. 6.7	191. 6.7	192. 6.7
458. 6.7	220. 0.0	1168. 4.3	33.1 3.1	501. 4.8	201. 6.8	201. 6.8	202. 6.8
475. 6.7	230. 0.0	1219. 4.3	35.1 3.1	526. 4.8	211. 6.9	211. 6.9	212. 6.9
492. 6.7	240. 0.0	1270. 4.3	37.1 3.1	551. 4.8	221. 7.0	221. 7.0	222. 7.0
509. 6.7	250. 0.0	1321. 4.3	39.1 3.1	576. 4.8	231. 7.1	231. 7.1	232. 7.1
526. 6.7	260. 0.0	1372. 4.3	41.1 3.1	601. 4.8	241. 7.2	241. 7.2	242. 7.2
543. 6.7	270. 0.0	1423. 4.3	43.1 3.1	626. 4.8	251. 7.3	251. 7.3	252. 7.3
560. 6.7	280. 0.0	1474. 4.3	45.1 3.1	651. 4.8	261. 7.4	261. 7.4	262. 7.4
577. 6.7	290. 0.0	1525. 4.3	47.1 3.1	676. 4.8	271. 7.5	271. 7.5	272. 7.5
594. 6.7	300. 0.0	1576. 4.3	49.1 3.1	701. 4.8	281. 7.6	281. 7.6	282. 7.6
611. 6.7	310. 0.0	1627. 4.3	51.1 3.1	726. 4.8	291. 7.7	291. 7.7	292. 7.7
628. 6.7	320. 0.0	1678. 4.3	53.1 3.1	751. 4.8	301. 7.8	301. 7.8	302. 7.8
645. 6.7	330. 0.0	1729. 4.3	55.1 3.1	776. 4.8	311. 7.9	311. 7.9	312. 7.9
662. 6.7	340. 0.0	1780. 4.3	57.1 3.1	801. 4.8	321. 8.0	321. 8.0	322. 8.0
679. 6.7	350. 0.0	1831. 4.3	59.1 3.1	826. 4.8	331. 8.1	331. 8.1	332. 8.1
696. 6.7	360. 0.0	1882. 4.3	61.1 3.1	851. 4.8	341. 8.2	341. 8.2	342. 8.2
713. 6.7	370. 0.0	1933. 4.3	63.1 3.1	876. 4.8	351. 8.3	351. 8.3	352. 8.3
730. 6.7	380. 0.0	1984. 4.3	65.1 3.1	901. 4.8	361. 8.4	361. 8.4	362. 8.4
747. 6.7	390. 0.0	2035. 4.3	67.1 3.1	926. 4.8	371. 8.5	371. 8.5	372. 8.5
764. 6.7	400. 0.0	2086. 4.3	69.1 3.1	951. 4.8	381. 8.6	381. 8.6	382. 8.6
781. 6.7	410. 0.0	2137. 4.3	71.1 3.1	976. 4.8	391. 8.7	391. 8.7	392. 8.7
798. 6.7	420. 0.0	2188. 4.3	73.1 3.1	1001. 4.8	401. 8.8	401. 8.8	402. 8.8
815. 6.7	430. 0.0	2239. 4.3	75.1 3.1	1026. 4.8	411. 8.9	411. 8.9	412. 8.9
832. 6.7	440. 0.0	2290. 4.3	77.1 3.1	1051. 4.8	421. 9.0	421. 9.0	422. 9.0
849. 6.7	450. 0.0	2341. 4.3	79.1 3.1	1076. 4.8	431. 9.1	431. 9.1	432. 9.1
866. 6.7	460. 0.0	2392. 4.3	81.1 3.1	1101. 4.8	441. 9.2	441. 9.2	442. 9.2
883. 6.7	470. 0.0	2443. 4.3	83.1 3.1	1126. 4.8	451. 9.3	451. 9.3	452. 9.3
900. 6.7	480. 0.0	2494. 4.3	85.1 3.1	1151. 4.8	461. 9.4	461. 9.4	462. 9.4
917. 6.7	490. 0.0	2545. 4.3	87.1 3.1	1176. 4.8	471. 9.5	471. 9.5	472. 9.5
934. 6.7	500. 0.0	2596. 4.3	89.1 3.1	1201. 4.8	481. 9.6	481. 9.6	482. 9.6
951. 6.7	510. 0.0	2647. 4.3	91.1 3.1	1226. 4.8	491. 9.7	491. 9.7	492. 9.7
968. 6.7	520. 0.0	2698. 4.3	93.1 3.1	1251. 4.8	501. 9.8	501. 9.8	502. 9.8
985. 6.7	530. 0.0	2749. 4.3	95.1 3.1	1276. 4.8	511. 9.9	511. 9.9	512. 9.9
1002. 6.7	540. 0.0	2800. 4.3	97.1 3.1	1301. 4.8	521. 10.0	521. 10.0	522. 10.0
1019. 6.7	550. 0.0	2851. 4.3	99.1 3.1	1326. 4.8	531. 10.1	531. 10.1	532. 10.1
1036. 6.7	560. 0.0	2902. 4.3	101.1 3.1	1351. 4.8	541. 10.2	541. 10.2	542. 10.2
1053. 6.7	570. 0.0	2953. 4.3	103.1 3.1	1376. 4.8	551. 10.3	551. 10.3	552. 10.3
1070. 6.7	580. 0.0	3004. 4.3	105.1 3.1	1401. 4.8	561. 10.4	561. 10.4	562. 10.4
1087. 6.7	590. 0.0	3055. 4.3	107.1 3.1	1426. 4.8	571. 10.5	571. 10.5	572. 10.5
1104. 6.7	600. 0.0	3106. 4.3	109.1 3.1	1451. 4.8	581. 10.6	581. 10.6	582. 10.6
1121. 6.7	610. 0.0	3157. 4.3	111.1 3.1	1476. 4.8	591. 10.7	591. 10.7	592. 10.7
1138. 6.7	620. 0.0	3208. 4.3	113.1 3.1	1501. 4.8	601. 10.8	601. 10.8	602. 10.8
1155. 6.7	630. 0.0	3259. 4.3	115.1 3.1	1526. 4.8	611. 10.9	611. 10.9	612. 10.9
1172. 6.7	640. 0.0	3310. 4.3	117.1 3.1	1551. 4.8	621. 11.0	621. 11.0	622. 11.0
1189. 6.7	650. 0.0	3361. 4.3	119.1 3.1	1576. 4.8	631. 11.1	631. 11.1	632. 11.1
1206. 6.7	660. 0.0	3412. 4.3	121.1 3.1	1601. 4.8	641. 11.2	641. 11.2	642. 11.2
1223. 6.7	670. 0.0	3463. 4.3	123.1 3.1	1626. 4.8	651. 11.3	651. 11.3	652. 11.3
1240. 6.7	680. 0.0	3514. 4.3	125.1 3.1	1651. 4.8	661. 11.4	661. 11.4	662. 11.4
1257. 6.7	690. 0.0	3565. 4.3	127.1 3.1	1676. 4.8	671. 11.5	671. 11.5	672. 11.5
1274. 6.7	700. 0.0	3616. 4.3	129.1 3.1	1701. 4.8	681. 11.6	681. 11.6	682. 11.6
1291. 6.7	710. 0.0	3667. 4.3	131.1 3.1	1726. 4.8	691. 11.7	691. 11.7	692. 11.7
1308. 6.7	720. 0.0	3718. 4.3	133.1 3.1	1751. 4.8	701. 11.8	701. 11.8	702. 11.8
1325. 6.7	730. 0.0	3769. 4.3	135.1 3.1	1776. 4.8	711. 11.9	711. 11.9	712. 11.9
1342. 6.7	740. 0.0	3820. 4.3	137.1 3.1	1801. 4.8	721. 12.0	721. 12.0	722. 12.0
1359. 6.7	750. 0.0	3871. 4.3	139.1 3.1	1826. 4.8	731. 12.1	731. 12.1	732. 12.1
1376. 6.7	760. 0.0	3922. 4.3	141.1 3.1	1851. 4.8	741. 12.2	741. 12.2	742. 12.2
1393. 6.7	770. 0.0	3973. 4.3	143.1 3.1	1876. 4.8	751. 12.3	751. 12.3	752. 12.3
1410. 6.7	780. 0.0	4024. 4.3	145.1 3.1	1901. 4.8	761. 12.4	761. 12.4	762. 12.4
1427. 6.7	790. 0.0	4075. 4.3	147.1 3.1	1926. 4.8	771. 12.5	771. 12.5	772. 12.5
1444. 6.7	800. 0.0	4126. 4.3	149.1 3.1	1951. 4.8	781. 12.6	781. 12.6	782. 12.6
1461. 6.7	810. 0.0	4177. 4.3	151.1 3.1	1976. 4.8	791. 12.7	791. 12.7	792. 12.7
1478. 6.7	820. 0.0	4228. 4.3	153.1 3.1	2001. 4.8	801. 12.8	801. 12.8	802. 12.8
1495. 6.7	830. 0.0	4279. 4.3	155.1 3.1	2026. 4.8	811. 12.9	811. 12.9	812. 12.9
1512. 6.7	840. 0.0	4330. 4.3	157.1 3.1	2051. 4.8	821. 13.0	821. 13.0	822. 13.0
1529. 6.7	850. 0.0	4381. 4.3	159.1 3.1	2076. 4.8	831. 13.1	831. 13.1	832. 13.1
1546. 6.7	860. 0.0	4432. 4.3	161.1 3.1	2101. 4.8	841. 13.2	841. 13.2	842. 13.2
1563. 6.7	870. 0.0	4483. 4.3	163.1 3.1	2126. 4.8	851. 13.3	851. 13.3	852. 13.3
1580. 6.7	880. 0.0	4534. 4.3	165.1 3.1	2151. 4.8	861. 13.4	861. 13.4	862. 13.4
1597. 6.7	890. 0.0	4585. 4.3	167.1 3.1				

DATE	SRVY	TIME	1200	DATE	SRVY	TIME	1200	DATE	SRVY	TIME	1200	DATE	SRVY	TIME	1200	DATE	SRVY	TIME	1200
650000	51	25	47	650031	0	6.8	23	650025	6	6.9	25	650120	25	4.1	26	650028	26	4.9	40
100	51	50	49	25	5.1	28	49	5.2	50	5.2	51	39	4.2	51	51	100	51	4.1	
150	4.5	100	4.5	50	4.9	50	4.9	4.9	100	4.6	101	4.6	101	4.6	100	100	4.6	4.6	
200	3.4	151	3.2	101	4.2	101	4.2	4.2	151	4.0	151	3.4	151	3.4	151	151	3.4	3.4	
250	2.9	201	2.8	151	3.7	201	3.7	3.7	201	3.5	201	3.1	201	3.1	201	252	2.8	2.8	
300	2.5	251	2.4	201	3.1	251	2.9	3.5	251	3.5	251	3.1	251	3.1	302	302	2.6	2.6	
350	2.1	302	2.0	251	2.9	301	2.9	3.5	301	3.7	301	3.0	301	3.0	352	352	2.6	2.6	
400	1.8	351	1.7	301	2.6	351	2.6	4.2	351	4.2	351	3.7	351	3.7	402	402	2.4	2.4	
450	1.5	401	1.4	351	2.0	401	2.0	4.2	401	4.2	401	3.9	401	3.9	452	452	2.4	2.4	
500	1.2	451	1.1	401	1.7	451	1.7	4.2	451	4.2	451	3.6	451	3.6	502	502	2.4	2.4	
550	1.0	501	0.9	451	1.5	501	1.5	4.2	501	4.2	501	3.4	501	3.4	552	552	2.4	2.4	
600	0.8	551	0.7	501	1.2	551	1.2	4.2	551	4.2	551	3.2	551	3.2	602	602	2.4	2.4	
650	0.6	601	0.5	551	1.0	601	1.0	4.2	601	4.2	601	3.0	601	3.0	652	652	2.4	2.4	
700	0.4	651	0.3	601	0.8	651	0.8	4.2	651	4.2	651	2.8	651	2.8	702	702	2.4	2.4	
750	0.3	701	0.2	651	0.6	701	0.6	4.2	701	4.2	701	2.6	701	2.6	752	752	2.4	2.4	
800	0.2	751	0.1	701	0.5	751	0.5	4.2	751	4.2	751	2.4	751	2.4	802	802	2.4	2.4	
850	0.1	801	0.0	751	0.4	801	0.4	4.2	801	4.2	801	2.2	801	2.2	852	852	2.4	2.4	
900	0.0	851	0.0	801	0.3	851	0.3	4.2	851	4.2	851	2.0	851	2.0	902	902	2.4	2.4	
950	0.0	901	0.0	851	0.2	901	0.2	4.2	901	4.2	901	1.8	901	1.8	952	952	2.4	2.4	
000	0.0	951	0.0	901	0.1	951	0.1	4.2	951	4.2	951	1.6	951	1.6	002	002	2.4	2.4	
050	0.0	001	0.0	951	0.0	001	0.0	4.2	001	4.2	001	1.4	001	1.4	052	052	2.4	2.4	
100	0.0	051	0.0	001	0.0	051	0.0	4.2	051	4.2	051	1.2	051	1.2	102	102	2.4	2.4	
150	0.0	101	0.0	051	0.0	101	0.0	4.2	101	4.2	101	1.0	101	1.0	152	152	2.4	2.4	
200	0.0	151	0.0	101	0.0	151	0.0	4.2	151	4.2	151	0.8	151	0.8	202	202	2.4	2.4	
250	0.0	201	0.0	151	0.0	201	0.0	4.2	201	4.2	201	0.6	201	0.6	252	252	2.4	2.4	
300	0.0	251	0.0	201	0.0	251	0.0	4.2	251	4.2	251	0.4	251	0.4	302	302	2.4	2.4	
350	0.0	301	0.0	251	0.0	301	0.0	4.2	301	4.2	301	0.2	301	0.2	352	352	2.4	2.4	
400	0.0	351	0.0	301	0.0	351	0.0	4.2	351	4.2	351	0.0	351	0.0	402	402	2.4	2.4	
450	0.0	401	0.0	351	0.0	401	0.0	4.2	401	4.2	401	0.0	401	0.0	452	452	2.4	2.4	
500	0.0	451	0.0	401	0.0	451	0.0	4.2	451	4.2	451	0.0	451	0.0	502	502	2.4	2.4	
550	0.0	501	0.0	451	0.0	501	0.0	4.2	501	4.2	501	0.0	501	0.0	552	552	2.4	2.4	
600	0.0	551	0.0	501	0.0	551	0.0	4.2	551	4.2	551	0.0	551	0.0	602	602	2.4	2.4	
650	0.0	601	0.0	551	0.0	601	0.0	4.2	601	4.2	601	0.0	601	0.0	652	652	2.4	2.4	
700	0.0	651	0.0	601	0.0	651	0.0	4.2	651	4.2	651	0.0	651	0.0	702	702	2.4	2.4	
750	0.0	701	0.0	651	0.0	701	0.0	4.2	701	4.2	701	0.0	701	0.0	752	752	2.4	2.4	
800	0.0	751	0.0	701	0.0	751	0.0	4.2	751	4.2	751	0.0	751	0.0	802	802	2.4	2.4	
850	0.0	801	0.0	751	0.0	801	0.0	4.2	801	4.2	801	0.0	801	0.0	852	852	2.4	2.4	
900	0.0	851	0.0	801	0.0	851	0.0	4.2	851	4.2	851	0.0	851	0.0	902	902	2.4	2.4	
950	0.0	901	0.0	851	0.0	901	0.0	4.2	901	4.2	901	0.0	901	0.0	952	952	2.4	2.4	
000	0.0	951	0.0	901	0.0	951	0.0	4.2	951	4.2	951	0.0	951	0.0	002	002	2.4	2.4	
050	0.0	001	0.0	951	0.0	001	0.0	4.2	001	4.2	001	0.0	001	0.0	052	052	2.4	2.4	
100	0.0	051	0.0	001	0.0	051	0.0	4.2	051	4.2	051	0.0	051	0.0	102	102	2.4	2.4	
150	0.0	101	0.0	051	0.0	101	0.0	4.2	101	4.2	101	0.0	101	0.0	152	152	2.4	2.4	
200	0.0	151	0.0	101	0.0	151	0.0	4.2	151	4.2	151	0.0	151	0.0	202	202	2.4	2.4	
250	0.0	201	0.0	151	0.0	201	0.0	4.2	201	4.2	201	0.0	201	0.0	252	252	2.4	2.4	
300	0.0	251	0.0	201	0.0	251	0.0	4.2	251	4.2	251	0.0	251	0.0	302	302	2.4	2.4	
350	0.0	301	0.0	251	0.0	301	0.0	4.2	301	4.2	301	0.0	301	0.0	352	352	2.4	2.4	
400	0.0	351	0.0	301	0.0	351	0.0	4.2	351	4.2	351	0.0	351	0.0	402	402	2.4	2.4	
450	0.0	401	0.0	351	0.0	401	0.0	4.2	401	4.2	401	0.0	401	0.0	452	452	2.4	2.4	
500	0.0	451	0.0	401	0.0	451	0.0	4.2	451	4.2	451	0.0	451	0.0	502	502	2.4	2.4	
550	0.0	501	0.0	451	0.0	501	0.0	4.2	501	4.2	501	0.0	501	0.0	552	552	2.4	2.4	
600	0.0	551	0.0	501	0.0	551	0.0	4.2	551	4.2	551	0.0	551	0.0	602	602	2.4	2.4	
650	0.0	601	0.0	551	0.0	601	0.0	4.2	601	4.2	601	0.0	601	0.0	652	652	2.4	2.4	
700	0.0	651	0.0	601	0.0	651	0.0	4.2	651	4.2	651	0.0	651	0.0	702	702	2.4	2.4	
750	0.0	701	0.0	651	0.0	701	0.0	4.2	701	4.2	701	0.0	701	0.0	752	752	2.4	2.4	
800	0.0	751	0.0	701	0.0	751	0.0	4.2	751	4.2	751	0.0	751	0.0	802	802	2.4	2.4	
850	0.0	801	0.0	751	0.0	801	0.0	4.2	801	4.2	801	0.0	801	0.0	852	852	2.4	2.4	
900	0.0	851	0.0	801	0.0	851	0.0	4.2	851	4.2	851	0.0	851	0.0	902	902	2.4	2.4	
950	0.0	901	0.0	851	0.0	901	0.0	4.2	901	4.2	901	0.0	901	0.0	952	952	2.4	2.4	
000	0.0	951	0.0	901	0.0	951	0.0	4.2	951	4.2	951	0.0	951	0.0	002	002	2.4	2.4	
050	0.0	001	0.0	951	0.0	001	0.0	4.2	001	4.2	001	0.0	001	0.0	052	052	2.4	2.4	
100	0.0	051	0.0	001	0.0	051	0.0	4.2	051	4.2	051	0.0	051	0.0	102	102	2.4	2.4	
150	0.0	101	0.0	051	0.0	101	0.0	4.2	101	4.2	101	0.0	101	0.0	152	152	2.4	2.4	
200	0.0	151	0.0	101	0.0	151	0.0	4.2	151	4.2	151	0.0	151	0.0	202	202	2.4	2.4	
250	0.0	201	0.0	151	0.0	201	0.0	4.2	201	4.2	201	0.0	201	0.0	252	252	2.4	2.4	
300	0.0	251	0.0	201	0.0	251	0.0	4.2	251	4.2	251	0.0	251	0.0	302	302	2.4	2.4	
350	0.0	301	0.0	251	0.0	301	0.0	4.2	301	4.2	301	0.0	301	0.0	352	352	2.4	2.4	
400	0.0	351	0.0	301	0.0	351	0.0	4.2	351	4.2	351	0.0	351	0.0	402	402	2.4	2.4	
450	0.0	401	0.0	351	0.0	401													

DATE 670503	DATE 670915	DATE 670919	DATE 671213	DATE 680115	DATE 680124	DATE 680130	DATE 680208
SRVY 49	SRVY 50	SRVY 51	SRVY 52	SRVY 53	SRVY 54	SRVY 55	SRVY 56
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
23	4.0	23	4.2	26	4.0	26	4.4
50	5.0	50	5.9	50	5.8	50	25
101	3.3	100	3.2	100	2.8	100	4.0
151	1.0	150	2.8	100	2.6	100	5.0
201	1.0	200	2.8	150	2.7	150	3.9
251	2.0	250	2.8	200	2.6	200	2.6
301	2.0	300	2.7	250	2.6	250	2.4
351	2.0	350	2.7	300	2.6	300	2.8
401	2.0	400	2.5	350	2.7	350	2.8
451	2.0	450	2.5	400	2.6	400	3.0
501	1.8	500	2.2	450	2.6	450	3.1
551	1.9	550	2.2	500	2.6	500	3.4
601	2.0	600	1.9	550	2.6	550	3.4
651	2.3	650	1.9	600	2.6	600	3.0
701	2.4	700	1.1	650	2.9	650	3.0
751	1.9	750	1.5	700	2.1	700	2.8
801	1.1	800	1.4	750	1.6	750	2.2
850	1.0	850	1.2	800	1.0	800	1.2
900	1.8	900	1.7	850	0.0	850	0.7
950	2.4	950	1.7	900	0.0	900	0.0
994	2.4	994	1.7	994	0.0	994	0.0

DATE 680215	DATE 680221	DATE 680226	DATE 680507	DATE 680513	DATE 680522	DATE 681007	DATE 681025
SRVY 57	SRVY 58	SRVY 59	SRVY 60	SRVY 61	SRVY 62	SRVY 63	SRVY 64
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
21	7.1	0.1	7.1	0	3.0	23	3
24	3.9	24	4.0	24	2.8	50	5
30	3.9	30	3.9	30	2.7	100	3.9
35	2.6	35	2.5	35	2.7	100	2.8
40	2.6	40	2.5	40	2.7	100	2.8
45	2.6	45	2.5	45	2.7	100	2.8
50	2.6	50	2.5	50	2.7	100	2.8
55	2.6	55	2.5	55	2.7	100	2.8
60	2.6	60	2.5	60	2.7	100	2.8
65	2.6	65	2.5	65	2.7	100	2.8
70	2.6	70	2.5	70	2.7	100	2.8
75	2.6	75	2.5	75	2.7	100	2.8
80	2.6	80	2.5	80	2.7	100	2.8
85	2.6	85	2.5	85	2.7	100	2.8
90	2.6	90	2.5	90	2.7	100	2.8
95	2.6	95	2.5	95	2.7	100	2.8
99	2.6	99	2.5	99	2.7	100	2.8

DATE 681115	DATE 681220	DATE 690113	DATE 690122	DATE 690205	DATE 690212	DATE 690219
SRVY 65	SRVY 66	SRVY 67	SRVY 68	SRVY 70	SRVY 71	SRVY 72
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
25	25	7.2	0	0	25	0
4.1	4.6	4.6	1.6	25	1.6	3.7
100	100	100	100	100	100	100
150	150	150	150	150	150	150
200	200	200	200	200	200	200
250	250	250	250	250	250	250
300	300	300	300	300	300	300
350	350	350	350	350	350	350
400	400	400	400	400	400	400
450	450	450	450	450	450	450
500	500	500	500	500	500	500
550	550	550	550	550	550	550
600	600	600	600	600	600	600
650	650	650	650	650	650	650
700	700	700	700	700	700	700
750	750	750	750	750	750	750
800	800	800	800	800	800	800
850	850	850	850	850	850	850
900	900	900	900	900	900	900

DATE 690226	DATE 690305	DATE 690312	DATE 690319	DATE 690324	DATE 690329	DATE 691120
SRVY 73	SRVY 74	SRVY 75	SRVY 76	SRVY 77	SRVY 78	SRVY 80
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
0	0	0	0	0	0	0
25	25	7.2	7.2	50	3.9	0
3.6	1.3	3.3	3.3	100	2.5	25
50	50	50	50	150	2.5	50
100	100	100	100	200	2.5	100
150	150	150	150	250	2.5	150
200	200	200	200	300	2.5	200
250	250	250	250	350	2.5	250
300	300	300	300	400	2.5	300
350	350	350	350	450	2.5	350
400	400	400	400	500	2.5	400
450	450	450	450	550	2.5	450
500	500	500	500	600	2.5	500
550	550	550	550	650	2.5	550
600	600	600	600	700	2.5	600
650	650	650	650	750	2.5	650
700	700	700	700	800	2.5	700
750	750	750	750	850	2.5	750
800	800	800	800	900	2.5	800
850	850	850	850	950	2.5	850
900	900	900	900	950	2.5	900

DATE 700120	DATE 700118	DATE 700121	DATE 700128	DATE 700209	DATE 700211	DATE 700218	DATE 700225
SRVY 81	SRVY 82	SRVY 83	SRVY 84	SRVY 85	SRVY 86	SRVY 87	SRVY 88
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
0. 7.2	7.2	0. 7.2	0. 7.2	0. 7.2	0. 7.2	0. 7.2	0. 7.2
25. 4.1	25. 4.1	25. 4.1	25. 4.1	25. 4.1	25. 4.1	25. 4.1	25. 4.1
50. 3.7	50. 3.7	50. 3.7	50. 3.7	50. 3.7	50. 3.7	50. 3.7	50. 3.7
100. 3.0	100. 3.0	100. 3.0	100. 3.0	100. 3.0	100. 3.0	100. 3.0	100. 3.0
150. 2.9	150. 2.9	150. 2.9	150. 2.9	150. 2.9	150. 2.9	150. 2.9	150. 2.9
200. 2.9	200. 2.9	200. 2.9	200. 2.9	200. 2.9	200. 2.9	200. 2.9	200. 2.9
250. 3.1	250. 3.1	250. 3.1	250. 3.1	250. 3.1	250. 3.1	250. 3.1	250. 3.1
300. 3.0	300. 3.0	300. 3.0	300. 3.0	300. 3.0	300. 3.0	300. 3.0	300. 3.0
350. 3.1	350. 3.1	350. 3.1	350. 3.1	350. 3.1	350. 3.1	350. 3.1	350. 3.1
400. 3.1	400. 3.1	400. 3.1	400. 3.1	400. 3.1	400. 3.1	400. 3.1	400. 3.1
450. 3.1	450. 3.1	450. 3.1	450. 3.1	450. 3.1	450. 3.1	450. 3.1	450. 3.1
500. 3.1	500. 3.1	500. 3.1	500. 3.1	500. 3.1	500. 3.1	500. 3.1	500. 3.1
550. 3.1	550. 3.1	550. 3.1	550. 3.1	550. 3.1	550. 3.1	550. 3.1	550. 3.1
600. 3.1	600. 3.1	600. 3.1	600. 3.1	600. 3.1	600. 3.1	600. 3.1	600. 3.1
650. 3.1	650. 3.1	650. 3.1	650. 3.1	650. 3.1	650. 3.1	650. 3.1	650. 3.1
700. 3.1	700. 3.1	700. 3.1	700. 3.1	700. 3.1	700. 3.1	700. 3.1	700. 3.1
750. 3.1	750. 3.1	750. 3.1	750. 3.1	750. 3.1	750. 3.1	750. 3.1	750. 3.1
800. 3.1	800. 3.1	800. 3.1	800. 3.1	800. 3.1	800. 3.1	800. 3.1	800. 3.1
850. 3.1	850. 3.1	850. 3.1	850. 3.1	850. 3.1	850. 3.1	850. 3.1	850. 3.1
900. 3.1	900. 3.1	900. 3.1	900. 3.1	900. 3.1	900. 3.1	900. 3.1	900. 3.1

DATE 7101210	DATE 7101113	DATE 7102009	DATE 7103111	DATE 7104012	DATE 7104007	DATE 7108110	DATE 7110008
SRVY 99	SRVY 98	SRVY 99	SRVY 100	SRVY 101	SRVY 102	SRVY 103	SRVY 104
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
0. 7.2	25. 5.0	25. 5.2	25. 4.9	25. 5.0	25. 5.2	25. 5.2	25. 4.9
25. 5.9	50. 6.0	50. 6.0	50. 5.7	50. 5.1	50. 5.2	50. 5.1	50. 5.2
100. 6.0	100. 6.0	100. 6.0	100. 5.7	100. 4.5	100. 4.8	100. 4.3	100. 4.5
150. 7.2	150. 5.6	150. 5.6	150. 5.4	150. 4.1	150. 4.5	150. 3.9	150. 4.0
200. 6.5	200. 4.9	200. 5.2	200. 4.7	200. 3.9	200. 4.1	200. 3.6	200. 3.9
250. 5.0	250. 4.8	250. 4.8	250. 4.2	250. 3.6	250. 3.9	250. 3.7	250. 3.7
300. 5.3	300. 4.5	300. 4.5	300. 4.0	300. 3.6	300. 3.6	300. 3.5	300. 3.5
350. 5.1	350. 4.2	350. 4.2	350. 3.7	350. 3.4	350. 3.7	350. 3.5	350. 3.5
400. 4.9	400. 3.9	400. 3.9	400. 3.5	400. 3.4	400. 3.7	400. 3.5	400. 3.5
450. 4.6	450. 4.2	450. 4.2	450. 3.1	450. 2.8	450. 3.4	450. 3.4	450. 3.4
500. 4.7	500. 4.4	500. 4.4	500. 3.1	500. 2.8	500. 3.4	500. 3.4	500. 3.4
550. 4.7	550. 4.4	550. 4.4	550. 2.9	550. 2.6	550. 3.5	550. 3.4	550. 3.5
600. 4.2	600. 4.1	600. 4.1	600. 2.8	600. 2.6	600. 4.6	600. 5.1	600. 3.1
650. 4.0	650. 3.1	650. 3.1	650. 2.8	650. 2.4	650. 4.6	650. 4.8	650. 2.7
700. 2.9	700. 1.8	700. 1.8	700. 2.0	700. 1.9	700. 2.6	700. 2.7	700. 2.3
750. 1.7	750. 1.3	750. 1.3	750. 1.0	750. 1.0	720. 2.7	720. 2.2	730. 1.7
800. 1.5	800. 1.1	800. 1.1	800. .8	800. .8	750. .1	750. .1	800. .9
850. .5	850. .2	850. .2	850. .1	850. .1	800. .1	850. .1	850. .4
900. .7	900. .2						
950. .5							
1000. .5							
1050. .5							
1100. .5							
1150. .5							
1200. .5							

DATE 7112113	DATE 7201110	DATE 7202114	DATE 7202212	DATE 7203117	DATE 7204110	DATE 7206211	DATE 7210210
SRVY 105	SRVY 106	SRVY 107	SRVY 108	SRVY 109	SRVY 110	SRVY 111	SRVY 112
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1300	TIME 1000
25. 4.7	25. 4.6	25. 5.0	25. 3.7	25. 4.0	25. 4.4	25. 4.4	25. 4.0
50. 5.1	50. 4.8	50. 4.8	50. 4.3	50. 4.4	50. 4.5	50. 4.5	50. 4.1
100. 4.4	100. 4.1	100. 4.2	100. 4.0	100. 4.0	100. 4.2	100. 4.2	100. 3.8
150. 4.1	150. 4.0	150. 4.0	150. 3.9	150. 3.9	150. 3.9	150. 3.9	150. 3.5
200. 4.0	200. 4.0	200. 4.1	200. 3.9	200. 3.9	200. 3.9	200. 3.9	200. 3.5
250. 3.9	250. 3.8	250. 4.1	250. 3.9	250. 3.9	250. 3.9	250. 3.9	250. 3.5
300. 3.6	300. 3.6	300. 4.0	300. 3.9	300. 3.9	300. 3.9	300. 3.9	300. 3.4
350. 3.5	350. 3.5	350. 4.0	350. 3.9	350. 3.9	350. 3.9	350. 3.9	350. 3.7
400. 3.5	400. 3.4	400. 4.1	400. 3.7	400. 3.7	400. 4.1	400. 3.7	400. 3.4
450. 3.7	450. 3.6	450. 4.1	450. 3.7	450. 3.7	450. 4.3	450. 3.7	450. 3.6
500. 3.5	500. 3.4	500. 3.2	500. 3.2	500. 3.5	500. 4.4	500. 3.5	500. 3.6
550. 3.2	550. 3.2	550. 3.2	550. 2.9	550. 3.6	550. 4.6	550. 3.6	550. 3.9
600. 4.5	600. 4.2	600. 4.0	600. 2.2	600. 3.1	576. 5.3	600. 5.2	600. 3.7
650. 4.3	650. 4.1	650. 4.1	650. 1.8	650. 2.3	600. 4.1	600. 7.0	650. 3.3
700. 3.7	700. .9	700. .9	700. 1.3	700. 1.3	620. 4.1	600. 7.0	700. 2.9
750. .7	750. .6	750. .6	750. .7	750. .2	700. 1.6	700. 3.2	750. 1.2
800. .7	800. .1	800. .1	800. .1	800. .2	700. .1	750. .1	800. .5
850. .8					725. .2	800. .8	
900. .8							
950. .8							
1000. .8							
1050. .8							
1100. .8							
1150. .8							
1200. .8							

DATE 721208	DATE 730105	DATE 730216	DATE 730316	DATE 730324	DATE 730403	DATE 730418
SRVY 113	SRVY 114	SRVY 115	SRVY 116	SRVY 117	SRVY 118	SRVY 119
TIME 1300	TIME 1000	TIME 1000	TIME 0900	TIME 700	TIME 1200	TIME 1100
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25. 4.3	25. 3.5	25. 3.5	25. 3.7	25. 3.2	25. 3.2	25. 3.5
50. 3.3	50. 3.4	50. 3.5	50. 3.2	50. 3.1	50. 3.1	50. 3.2
100. 3.2	100. 3.4	100. 3.0	100. 2.6	100. 2.5	100. 2.5	100. 2.4
150. 3.2	150. 3.2	150. 3.0	150. 2.7	150. 2.4	150. 2.4	150. 2.3
200. 3.0	200. 3.1	200. 3.0	200. 2.7	200. 2.4	200. 2.4	200. 2.3
250. 3.0	250. 3.0	250. 3.0	250. 3.1	250. 2.3	250. 2.4	250. 2.2
300. 3.0	300. 3.1	300. 3.0	300. 3.2	300. 2.2	300. 2.5	300. 2.3
350. 3.5	350. 3.4	350. 3.1	350. 3.2	350. 2.2	350. 2.5	350. 2.2
400. 3.4	400. 3.4	400. 2.9	400. 3.2	400. 2.3	400. 2.6	400. 2.2
450. 3.5	450. 3.4	450. 2.6	450. 3.4	450. 2.1	450. 2.4	450. 2.2
500. 5.2	500. 3.4	500. 2.9	500. 3.7	500. 1.7	500. 2.3	500. 2.2
550. 5.8	550. 4.4	550. 2.6	550. 3.8	550. 1.3	550. 4.0	550. 2.4
600. 5.4	600. 4.7	600. 2.1	600. 3.3	600. 1.0	600. 4.3	600. 2.9
619. 5.8	600. 4.5	650. 1.7	650. 1.8	650. 1.2	600. 3.9	650. 4.5
650. 1.2	650. 2.3	700. .8	700. .1	700. 1.1	650. 2.1	700. 1.8
690. .1.6	700. .2	750. .2	750. .3	750. .6	700. .2	750. .5
	725. .1.3	800. .1.4	800. .1.0	800. .6	750. .5	800. .2
			850. .2.0		800. .1.4	850. .1.8
					850. .2.0	

DATE 621024	DATE 621101	DATE 621109	DATE 621212	DATE 630109	DATE 630116	DATE 630122
SRVY 1	SRVY 2	SRVY 3	SRVY 4	SRVY 5	SRVY 6	SRVY 7
TIME 1200	TIME 1200	TIME 1200	TIME 1800	TIME 1200	TIME 1200	TIME 1200
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66. 7.3	65. 5.1	65. 6.1	71. 3.3	65. 5.4	65. 5.6	65. 5.6
102. 2.3	101. 5.1	111. 3.3	102. 4.0	75. 2.3	76. 3.3	76. 3.3
142. 1.5	141. 1.6	142. 1.2	141. 1.8	125. 1.3	106. 1.7	106. 1.7
181. 1.6	180. 1.6	181. 1.4	156. 1.6	156. 1.6	125. 2.2	125. 2.3
221. .7	223. .1.3	223. .7	203. .2.3	180. 1.6	149. .2	150. .8
261. .1.2	251. .2.0	311. .2.3	231. .4.3	177. .1	173. .5	173. .8
			288. .1.1	288. .1.1	201. .6	201. .2.1
					228. .1.1	228. .1.1

[illegible]

DATE 630925	DATE 631009	DATE 631028	DATE 631114	DATE 631231	DATE 640117	DATE 640214	DATE 640312
SRVY 35	SRVY 26	SRVY 27	SRVY 28	SRVY 29	SRVY 30	SRVY 31	SRVY 32
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
100. 7.6	-101. 7.4	143. 8.7	-101. 7.6	143. 6.6	-102. 7.4	147. 9.5	150. 8.5
151. 9.0	-51. 7.4	151. 9.4	-31. 7.6	17. 7.3	-21. 7.5	150. 7.8	179. 6.0
175. 8.6	0. 7.4	176. 8.6	0. 7.6	17. 7.3	54. 7.5	201. 7.8	202. 5.5
201. 8.0	6. 7.4	201. 8.8	61. 7.3	22. 5.5	54. 7.4	222. 1.7	222. 1.0
227. 8.2	10. 7.6	213. 9.1	143. 7.3	22. 5.5	62. 7.4	302. 8.4	252. 1.0
252. 8.5	14. 7.6	213. 9.1	143. 7.3	22. 5.5	125. 6.5	333. 8.7	279. 1.1
279. 8.8	18. 7.6	213. 9.1	143. 7.3	22. 5.5	140. 6.6	304. 8.7	304. 8.7
304. 9.0	22. 7.6	213. 9.1	143. 7.3	22. 5.5	147. 9.4	321. 8.7	321. 8.7
321. 9.2	26. 7.6	213. 9.1	143. 7.3	22. 5.5	151. 7.4		
347. 9.4	30. 7.6	213. 9.1	143. 7.3	22. 5.5	201. 3.5		
373. 9.6	34. 7.6	213. 9.1	143. 7.3	22. 5.5	252. 1.6		
400. 9.8	38. 7.6	213. 9.1	143. 7.3	22. 5.5	303. 3.3		
426. 10.0	42. 7.6	213. 9.1	143. 7.3	22. 5.5	332. 3.0		

DATE 640409	DATE 640527	DATE 640624	DATE 640831	DATE 640925	DATE 641203	DATE 650120	DATE 650428
SRVY 33	SRVY 34	SRVY 35	SRVY 36	SRVY 37	SRVY 38	SRVY 39	SRVY 40
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
150. 8.5	135. 6.4	141. 9.5	63. 7.0	-101. 7.5	141. 5.0	62. 7.4	62. 7.5
176. 6.3	144. 6.6	147. 7.7	160. 6.9	-50. 7.5	176. 4.7	142. 5.4	176. 4.2
227. 3.0	177. 7.0	191. 4.9	185. 7.6	0. 7.5	201. 2.5	151. 4.7	222. 2.2
277. 2.2	201. 6.1	212. 3.2	191. 6.8	5. 7.5	226. 1.3	176. 3.0	226. 2.2
327. 2.0	213. 5.7	213. 5.5	221. 4.6	63. 7.5	252. 0.0	202. 2.1	252. 0.0
352. 2.8	226. 3.7	213. 5.5	221. 4.6	100. 6.0	272. 0.0	226. 2.1	272. 0.0
377. 2.0	252. 1.3	213. 5.5	221. 4.6	121. 4.4	272. 0.0	226. 2.1	272. 0.0
402. 2.8	277. 0.0	213. 5.5	221. 4.6	141. 2.2	272. 0.0	226. 2.1	272. 0.0
427. 2.8	302. 0.0	213. 5.5	221. 4.6	161. 1.0	272. 0.0	226. 2.1	272. 0.0
452. 2.8	327. 0.0	213. 5.5	221. 4.6	181. 0.0	272. 0.0	226. 2.1	272. 0.0
477. 2.8	352. 0.0	213. 5.5	221. 4.6	201. 0.0	272. 0.0	226. 2.1	272. 0.0
502. 2.8	377. 0.0	213. 5.5	221. 4.6	226. 0.0	272. 0.0	226. 2.1	272. 0.0

DATE 650008 SRVY 49 TIME 1200 -----	DATE 651008 SRVY 52 TIME 1200 -----	DATE 651220 SRVY 51 TIME 1200 -----	DATE 660124 SRVY 53 TIME 1200 -----	DATE 660330 SRVY 53 TIME 1200 -----	DATE 660826 SRVY 54 TIME 1200 -----	DATE 661103 SRVY 55 TIME 1200 -----	DATE 670118 SRVY 56 TIME 1200 -----
62. 7.5 61. 7.4 136. 7.2 139. 4.5 139. 5.4 139. 2.7 150. 5.2 151. 6.9 141. 7.2 161. 7.0 175. 3.3 174. 3.5 169. 6.1 150. 4.8 151. 6.7 159. 5.9 152. 6.0 235. 2.5 200. 2.4 200. 4.0 200. 2.7 176. 7.0 176. 3.8 176. 4.4 250. 0.3 225. 0.4 225. 0.3 280. 0.3 202. 4.5 226. 1.0 291. 3.5 286. 0.3 250. 0.7 250. 0.3 275. 0.8 227. 2.0 227. 1.8 300. 0.3 300. 0.3 290. 0.3 300. 0.3 325. 232. 0.4 326. 0.8 277. 0.8 277. 0.8 277. 0.8 277. 0.8 277. 0.8 277. 0.4 338. 0.4 338. 0.4 338. 0.4 338. 0.4 338. 0.4 338. 0.4 327. 0.9 378. 0.9 378. 0.9 378. 0.9 378. 0.9 378. 0.9 378. 0.9 377. 0.9 377. 0.9 377. 0.9 377. 0.9 377. 0.9 377. 0.9 377. 0.9							
DATE 670503 SRVY 49 TIME 1200 -----	DATE 670919 SRVY 50 TIME 1200 -----	DATE 670919 SRVY 51 TIME 1200 -----	DATE 671213 SRVY 52 TIME 1200 -----	DATE 680118 SRVY 53 TIME 1200 -----	DATE 680184 SRVY 54 TIME 1200 -----	DATE 680130 SRVY 55 TIME 1200 -----	DATE 680208 SRVY 56 TIME 1200 -----
139. 4.6 140. 6.8 136. 5.2 139. 4.3 139. 2.9 140. 3.9 140. 3.4 139. 4.0 174. 2.7 150. 7.0 180. 2.5 175. 2.1 175. 2.7 181. 2.6 150. 2.7 150. 3.4 225. 0.3 140. 7.0 204. 2.8 200. 1.1 200. 0.8 175. 0.8 175. 1.2 200. 1.2 250. 0.9 200. 4.4 300. 0.9 250. 1.4 250. 0.8 250. 0.8 250. 0.8 250. 0.8 300. 0.9 225. 2.2 350. 0.7 300. 0.7 300. 0.7 300. 0.7 300. 0.7 300. 0.7 325. 0.9 300. 0.7 351. 0.9 351. 0.9 351. 0.9 351. 0.9 351. 0.9 351. 0.9 376. 0.9 376. 0.9 376. 0.9 376. 0.9 376. 0.9 376. 0.9 376. 0.9 376. 0.9							
DATE 680215 SRVY 57 TIME 1200 -----	DATE 680221 SRVY 58 TIME 1200 -----	DATE 680226 SRVY 59 TIME 1200 -----	DATE 680307 SRVY 60 TIME 1200 -----	DATE 680313 SRVY 61 TIME 1200 -----	DATE 680322 SRVY 62 TIME 1200 -----	DATE 681007 SRVY 63 TIME 1200 -----	DATE 681025 SRVY 64 TIME 1200 -----
100. 4.3 140. 4.7 140. 5.3 140. 3.9 140. 3.9 140. 3.9 140. 3.9 140. 3.9 151. 3.8 150. 3.8 150. 4.2 150. 3.5 150. 3.5 150. 3.5 150. 3.5 150. 3.5 200. 0.5 150. 3.8 150. 3.8 150. 3.8 150. 3.8 150. 3.8 150. 3.8 150. 3.8 231. 0.0 150. 3.8 150. 3.8 150. 3.8 150. 3.8 150. 3.8 150. 3.8 150. 3.8 301. 0.1 200. 1.1 200. 1.1 200. 1.1 200. 1.1 200. 1.1 200. 1.1 200. 1.1 380. 0.3 225. 0.4 225. 0.4 225. 0.4 225. 0.4 225. 0.4 225. 0.4 225. 0.4 400. 0.4 275. 0.4 275. 0.4 275. 0.4 275. 0.4 275. 0.4 275. 0.4 275. 0.4 400. 0.4 275. 0.4 275. 0.4 275. 0.4 275. 0.4 275. 0.4 275. 0.4 275. 0.4 400. 0.4 275. 0.4 275. 0.4 275. 0.4 275. 0.4 275. 0.4 275. 0.4 275. 0.4							

DATE 601115	DATE 601220	DATE 600113	DATE 600122	DATE 600205	DATE 600212	DATE 600219
SRVY 83	SRVY 86	SRVY 87	SRVY 88	SRVY 70	SRVY 71	SRVY 72
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
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140. 3.9	140. 5.1	140. 4.3	140. 2.1	140. 2.6	140. 2.9	140. 2.3
150. 3.6	150. 4.7	150. 3.7	150. 1.9	150. 2.0	150. 2.2	150. 1.8
175. 2.5	175. 3.5	175. 2.5	175. .9	175. .9	175. .7	175. 1.0
200. 1.6	200. 2.0	200. 1.0	200. .-1	200. .3	200. .2	200. .2
225. 1.6	225. .9	225. .6	225. .-8	230. .-1.0	230. .-7	230. .-6
250. 0.0	250. .-5	250. .-2.1	250. .-1.6	250. .-2.3	300. .-2.9	250. .-1.2
275. .-2	275. .-1.9	300. .-2.1	275. .-2.6	300. .-3.7	300. .-3.2	275. .-1.9
300. .-1.5	300. .-2.3	350. .-2.7	275. .-2.0	400. .-4.6	300. .-4.2	300. .-2.2
325. .-2.7	325. .-3.1		350. .-2.6			325. .-2.6
350. .-3.5						

DATE 600226	DATE 600304	DATE 600312	DATE 600319	DATE 600327	DATE 600333	DATE 600320
SRVY 73	SRVY 74	SRVY 75	SRVY 76	SRVY 77	SRVY 78	SRVY 80
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
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140. 2.3	140. 1.4	140. 1.6	140. 2.4	140. 3.8	140. 9.9	140. 4.7
150. 1.4	150. 1.4	150. .9	150. 2.0	150. 3.1	150. 4.6	150. 3.7
175. .-4	175. .7	175. .2	175. 1.1	200. .1	200. 1.9	175. 3.1
200. .-6	200. .-7	200. .2	200. .3	250. .-2	250. .-7	200. 1.8
225. .-1.6	225. .-1.2	225. .-6	250. .-5	300. .-2	300. .-1.6	225. 1.6
250. .-1.6	250. .-1.0	275. .-1.9	300. .-2.4	300. .-1.7	300. .-2.1	250. 0.0
275. .-1.0	275. .-1.3	300. .-2.1	300. .-5.3	350. .-2.7	350. 2.4	275. .-1.0
300. .-3.0	300. .-3.1	325. .-2.6			400. .-5.0	300. .-2.0
	350. .-1.4	350. .-3.3				325. .-3.1
	400. .-5.4	400. .-4.3				

DATE 601216	DATE 700114	DATE 700204	DATE 700211	DATE 700218	DATE 700225	DATE 700228
SRVY 81	SRVY 82	SRVY 83	SRVY 84	SRVY 85	SRVY 86	SRVY 86
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
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140. 3.5	140. 3.2	140. 3.8	140. 3.9	140. 1.5	140. 2.6	140. 3.3
150. 2.9	150. 2.9	150. 3.4	150. 3.3	150. 1.1	150. 2.5	150. 2.9
200. .9	200. .1	200. 1.1	175. 1.6	200. .-7	175. 1.7	175. .1
250. .-2	250. .-6	250. .-8	250. .9	250. .-1.7	200. .9	200. 0.6
300. .-1.3	300. .-1.9	300. .-1.9	250. .-7	300. .-2.7	250. .-1.6	225. .-1
350. .-2.0	350. .-2.4	350. .-2.5	300. .-2.1	340. .-2.6	250. .-1.3	250. 0.0
	400. .-2.6		300. .-2.9		300. .-9	275. .-6
					350. .-2.0	300. .-1.6
						350. .-3.2

DATE 701304 SRVY 49 TIME 1200 140. 4.3 150. 3.8 200. 1.3 250. 1.9 300. -1.9 350. -2.8 400. -3.1 450. -3.8	DATE 700311 SRVY 40 TIME 1200 140. 4.4 150. 4.0 200. 2.5 250. 1.9 300. -1.5 350. -2.8 400. -3.9	DATE 700310 SRVY 01 TIME 1200 140. 4.3 150. 3.5 200. -0.9 250. -1.9 300. -1.9 350. -3.5 400. -4.0	DATE 700510 SRVY 92 TIME 1200 140. 5.1 150. 4.3 200. 0.0 250. -2.2 300. -2.2 350. -2.2 400. -2.2	DATE 700826 SRVY 43 TIME 1200 140. 7.3 150. 7.0 200. 6.0 250. 6.1 300. 6.1 350. 9.2 400. 9.2 450. 3.3 500. 0.0 550. -1.2 600. -2.4 650. -3.3	DATE 701015 SRVY 94 TIME 1200 140. 7.4 150. 6.0 200. 7.9 250. 7.9 300. 8.3 350. 9.3 400. 6.2 450. 3.8 500. 0.0 550. -2.3 600. -3.3	DATE 701106 SRVY 95 TIME 1200 140. 7.9 150. 6.1 200. 0.4 250. 6.2 300. 8.9 350. 9.9 400. 0.4 450. -2.4 500. -3.1	DATE 701200 SRVY 96 TIME 1200 140. 7.8 150. 6.1 200. 0.3 250. 6.2 300. 2.7 350. 0.6 400. -1.9	DATE 711004 SRVY 104 TIME 1200 140. 6.1 150. 5.2 200. 1.2 250. -2.2 300. -2.3 350. -3.3 400. -3.3	DATE 710816 SRVY 103 TIME 1200 140. 6.7 150. 7.1 200. 1.1 250. -1.9 300. -1.9	DATE 711008 SRVY 102 TIME 1200 140. 6.1 150. 5.3 200. 5.0 250. 3.8 300. 3.8 350. -3.1 400. -3.1	DATE 720021 SRVY 111 TIME 1300 140. 7.1 150. 3.1 200. 7.4 250. 6.1 300. 5.8 350. 4.3 400. 1.2 450. -2.2 500. -2.3	DATE 720020 SRVY 112 TIME 1300 140. 5.1 150. 4.6 200. 1.7 250. -0.9 300. -1.6 350. -1.6	DATE 720222 SRVY 108 TIME 1200 140. 3.3 150. 3.8 200. 1.6 250. -0.3 300. -2.3 350. -2.3	DATE 720214 SRVY 107 TIME 1200 140. 4.0 150. 3.8 200. 1.1 250. -2.4 300. -1.8 350. -3.2	DATE 720110 SRVY 106 TIME 1200 140. 6.2 150. 7.5 200. 3.2 250. 0.9 300. -1.4	DATE 711213 SRVY 105 TIME 1200 140. 6.2 150. 6.2 200. 5.0 250. 4.3 300. -1.4 350. -2.0
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DATE 430205	DATE 430213	DATE 430221	DATE 430227	DATE 430307	DATE 430313	DATE 430321	DATE 430402
BRVY 9	BRVY 10	BRVY 11	BRVY 12	BRVY 13	BRVY 14	BRVY 15	BRVY 16
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
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0. 9.6	-1. 8.4	9.6	-1. 9.6	123. 6.7	9. 9.6	73. 8.4	150. 6.1
2. 9.0	73. 4.8	8.8 2.8	2. 8.9	151. 6.0	23. 8.9	100. 7.3	173. 5.3
46. 8.6	99. 7.8	5. 5.3	4. 8.6	176. 5.2	50. 8.5	150. 7.3	223. 3.0
73. 8.3	126. 6.9	100. 7.3	7. 8.3	200. 4.8	74. 8.4	171. 5.3	251. 1.7
100. 7.3	150. 6.0	150. 6.1	123. 6.1	227. 3.7	100. 7.5	200. 4.3	301. 0.3
126. 8.4	161. 5.4	176. 5.0	150. 6.1	250. 2.3	150. 6.2	230. 2.2	323. 0.8
177. 8.0	200. 4.9	202. 4.2	173. 4.1	273. 1.4	176. 5.5	300. 0.2	350. 7.9
230. 3.6	230. 3.0	227. 3.7	273. 4.2	301. 0.7	200. 2.9	323. 0.2	376. 0.0
273. 3.7	273. 2.8	273. 2.9	273. 4.1	351. 0.0	351. 0.0	351. 0.0	376. 0.0
323. 2.1	323. 2.1	323. 2.1	323. 2.1	376. 0.0	376. 0.0	376. 0.0	376. 0.0
376. 2.7	376. 2.7	376. 2.7	376. 2.7	376. 0.0	376. 0.0	376. 0.0	376. 0.0
400. 2.7	400. 2.7	400. 2.7	400. 2.7	400. 2.7	400. 2.7	400. 2.7	400. 2.7
450. 2.7	450. 2.7	450. 2.7	450. 2.7	450. 2.7	450. 2.7	450. 2.7	450. 2.7
500. 2.7	500. 2.7	500. 2.7	500. 2.7	500. 2.7	500. 2.7	500. 2.7	500. 2.7
550. 2.7	550. 2.7	550. 2.7	550. 2.7	550. 2.7	550. 2.7	550. 2.7	550. 2.7
600. 2.7	600. 2.7	600. 2.7	600. 2.7	600. 2.7	600. 2.7	600. 2.7	600. 2.7
650. 2.7	650. 2.7	650. 2.7	650. 2.7	650. 2.7	650. 2.7	650. 2.7	650. 2.7
700. 2.7	700. 2.7	700. 2.7	700. 2.7	700. 2.7	700. 2.7	700. 2.7	700. 2.7
750. 2.7	750. 2.7	750. 2.7	750. 2.7	750. 2.7	750. 2.7	750. 2.7	750. 2.7
800. 2.7	800. 2.7	800. 2.7	800. 2.7	800. 2.7	800. 2.7	800. 2.7	800. 2.7
850. 2.7	850. 2.7	850. 2.7	850. 2.7	850. 2.7	850. 2.7	850. 2.7	850. 2.7
900. 2.7	900. 2.7	900. 2.7	900. 2.7	900. 2.7	900. 2.7	900. 2.7	900. 2.7
950. 2.7	950. 2.7	950. 2.7	950. 2.7	950. 2.7	950. 2.7	950. 2.7	950. 2.7
1000. 2.7	1000. 2.7	1000. 2.7	1000. 2.7	1000. 2.7	1000. 2.7	1000. 2.7	1000. 2.7

DATE 430523	DATE 430611	DATE 430626	DATE 430712	DATE 430724	DATE 430807	DATE 430823	DATE 430908
BRVY 9	BRVY 10	BRVY 10	BRVY 20	BRVY 21	BRVY 22	BRVY 23	BRVY 24
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
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-8. 10.0	10.1 0.0	158. 10.4	0. 0.0	-1. 10.1	0. 10.0	126. 10.3	223. 10.0
9. 9.0	50. 9.4	200. 9.4	50. 9.4	25. 9.4	23. 9.4	150. 10.4	173. 10.3
100. 9.3	100. 9.4	250. 10.2	100. 9.4	70. 9.4	51. 9.4	178. 10.4	223. 9.4
150. 10.4	149. 10.5	275. 10.2	150. 10.4	99. 9.5	100. 9.4	199. 9.4	300. 9.4
200. 10.4	200. 10.5	300. 10.2	176. 10.3	149. 10.5	150. 10.3	223. 10.4	323. 9.4
250. 10.3	250. 10.2	325. 10.2	200. 10.4	176. 10.3	150. 10.3	250. 10.4	350. 9.4
300. 10.3	300. 10.2	350. 10.2	250. 10.4	200. 10.3	200. 10.3	276. 9.3	376. 9.3
350. 10.3	350. 10.2	375. 10.2	300. 10.4	250. 10.3	250. 10.3	300. 9.3	401. 9.3
400. 10.3	400. 10.2	400. 10.2	350. 10.4	300. 10.3	300. 10.3	323. 9.3	423. 9.3
450. 10.3	450. 10.2	450. 10.2	400. 10.4	350. 10.3	350. 10.3	350. 9.3	450. 9.3
500. 10.3	500. 10.2	500. 10.2	450. 10.4	400. 10.3	400. 10.3	376. 9.3	476. 9.3
550. 10.3	550. 10.2	550. 10.2	500. 10.4	450. 10.3	450. 10.3	400. 9.3	500. 9.3
600. 10.3	600. 10.2	600. 10.2	550. 10.4	500. 10.3	500. 10.3	423. 9.3	523. 9.3
650. 10.3	650. 10.2	650. 10.2	600. 10.4	550. 10.3	550. 10.3	450. 9.3	550. 9.3
700. 10.3	700. 10.2	700. 10.2	650. 10.4	600. 10.3	600. 10.3	476. 9.3	576. 9.3
750. 10.3	750. 10.2	750. 10.2	700. 10.4	650. 10.3	650. 10.3	500. 9.3	600. 9.3
800. 10.3	800. 10.2	800. 10.2	750. 10.4	700. 10.3	700. 10.3	523. 9.3	623. 9.3
850. 10.3	850. 10.2	850. 10.2	800. 10.4	750. 10.3	750. 10.3	550. 9.3	650. 9.3
900. 10.3	900. 10.2	900. 10.2	850. 10.4	800. 10.3	800. 10.3	576. 9.3	676. 9.3
950. 10.3	950. 10.2	950. 10.2	900. 10.4	850. 10.3	850. 10.3	600. 9.3	700. 9.3
1000. 10.3	1000. 10.2	1000. 10.2	1000. 10.4	900. 10.3	900. 10.3	623. 9.3	723. 9.3

DATE 630225	DATE 631009	DATE 631028	DATE 631114	DATE 631231	DATE 640117	DATE 640214	DATE 640312
SHVY 25	SHVY 26	SHVY 27	SHVY 28	SHVY 29	SHVY 30	SHVY 31	SHVY 32
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
74. 9.2	-1. 9.9	175. 9.9	-1. 9.9	-1. 9.9	0. 10.0	50. 8.6	0. 9.9
101. 9.7	24. 9.9	201. 9.8	25. 9.9	24. 9.9	50. 8.6	101. 9.4	50. 8.9
125. 10.5	50. 9.0	227. 10.0	50. 9.0	50. 9.0	101. 9.5	151. 10.2	100. 9.4
175. 9.8	74. 9.3	252. 9.9	74. 9.3	74. 9.9	151. 10.4	201. 9.7	151. 10.5
201. 9.8	121. 10.4	276. 9.2	125. 10.3	100. 9.3	201. 9.5	252. 10.0	201. 9.5
227. 10.0	151. 10.3	297. 9.3	151. 10.2	102. 9.3	252. 9.6	281. 9.4	251. 10.0
252. 9.5	175. 9.9	324. 9.3	176. 9.7	177. 10.0	276. 8.1	302. 9.8	281. 9.0
276. 9.3	201. 9.9	349. 9.3	201. 9.9	193. 9.8	276. 8.1	332. 9.8	302. 8.2
297. 9.3	225. 10.0	374. 9.3	225. 10.0	217. 9.8	301. 9.8	362. 1.2	326. 2.1
324. 9.3	252. 9.4	404. 9.3	252. 9.4	252. 9.8	351. 9.2	402. 1.2	372. 2.9
349. 9.3	277. 9.9	429. 9.3	277. 9.9	252. 9.8	351. 9.2	432. 1.2	372. 2.9
374. 9.3	302. 9.4	454. 9.3	302. 9.4	276. 9.7	351. 9.2	462. 1.2	402. 1.2
399. 9.3	327. 9.9	479. 9.3	327. 9.9	276. 9.7	351. 9.2	492. 1.2	432. 1.2
424. 9.3	352. 1.2	504. 9.3	352. 1.2	276. 9.7	351. 9.2	522. 1.2	462. 1.2
449. 9.3	377. 1.2	529. 9.3	377. 1.2	276. 9.7	351. 9.2	552. 1.2	492. 1.2
474. 9.3	402. 1.2	554. 9.3	402. 1.2	276. 9.7	351. 9.2	582. 1.2	522. 1.2
499. 9.3	427. 1.2	579. 9.3	427. 1.2	276. 9.7	351. 9.2	612. 1.2	552. 1.2
524. 9.3	452. 1.2	604. 9.3	452. 1.2	276. 9.7	351. 9.2	642. 1.2	582. 1.2
549. 9.3	477. 1.2	629. 9.3	477. 1.2	276. 9.7	351. 9.2	672. 1.2	612. 1.2
574. 9.3	502. 1.2	654. 9.3	502. 1.2	276. 9.7	351. 9.2	702. 1.2	642. 1.2
599. 9.3	527. 1.2	679. 9.3	527. 1.2	276. 9.7	351. 9.2	732. 1.2	672. 1.2
624. 9.3	552. 1.2	704. 9.3	552. 1.2	276. 9.7	351. 9.2	762. 1.2	702. 1.2
649. 9.3	577. 1.2	729. 9.3	577. 1.2	276. 9.7	351. 9.2	792. 1.2	732. 1.2
674. 9.3	602. 1.2	754. 9.3	602. 1.2	276. 9.7	351. 9.2	822. 1.2	762. 1.2
699. 9.3	627. 1.2	779. 9.3	627. 1.2	276. 9.7	351. 9.2	852. 1.2	792. 1.2
724. 9.3	652. 1.2	804. 9.3	652. 1.2	276. 9.7	351. 9.2	882. 1.2	822. 1.2
749. 9.3	677. 1.2	829. 9.3	677. 1.2	276. 9.7	351. 9.2	912. 1.2	852. 1.2
774. 9.3	702. 1.2	854. 9.3	702. 1.2	276. 9.7	351. 9.2	942. 1.2	882. 1.2
799. 9.3	727. 1.2	879. 9.3	727. 1.2	276. 9.7	351. 9.2	972. 1.2	912. 1.2
824. 9.3	752. 1.2	904. 9.3	752. 1.2	276. 9.7	351. 9.2	1002. 1.2	942. 1.2
849. 9.3	777. 1.2	929. 9.3	777. 1.2	276. 9.7	351. 9.2	1032. 1.2	972. 1.2
874. 9.3	802. 1.2	954. 9.3	802. 1.2	276. 9.7	351. 9.2	1062. 1.2	1002. 1.2
899. 9.3	827. 1.2	979. 9.3	827. 1.2	276. 9.7	351. 9.2	1092. 1.2	1032. 1.2
924. 9.3	852. 1.2	1004. 9.3	852. 1.2	276. 9.7	351. 9.2	1122. 1.2	1062. 1.2
949. 9.3	877. 1.2	1029. 9.3	877. 1.2	276. 9.7	351. 9.2	1152. 1.2	1092. 1.2
974. 9.3	902. 1.2	1054. 9.3	902. 1.2	276. 9.7	351. 9.2	1182. 1.2	1122. 1.2
999. 9.3	927. 1.2	1079. 9.3	927. 1.2	276. 9.7	351. 9.2	1212. 1.2	1152. 1.2

DATE 640409	DATE 640528	DATE 640628	DATE 640703	DATE 640825	DATE 640925	DATE 641031	DATE 641120
SHVY 33	SHVY 34	SHVY 35	SHVY 36	SHVY 37	SHVY 38	SHVY 39	SHVY 40
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
-1. 8.9	-1. 9.9	-1. 9.9	0. 9.8	0. 9.4	0. 9.4	0. 9.8	0. 10.4
8.9 8.9	9.9 9.9	9.9 9.9	9.9 9.9	9.9 9.9	9.9 9.9	9.9 9.9	9.9 9.9
10.4 10.4	10.4 10.4	10.4 10.4	10.4 10.4	10.4 10.4	10.4 10.4	10.4 10.4	10.4 10.4
150. 10.3	151. 10.3	151. 10.3	151. 10.3	151. 10.3	151. 10.3	151. 10.3	151. 10.3
201. 10.4	202. 10.4	202. 10.4	202. 10.4	202. 10.4	202. 10.4	202. 10.4	202. 10.4
251. 10.4	252. 10.4	252. 10.4	252. 10.4	252. 10.4	252. 10.4	252. 10.4	252. 10.4
275. 10.4	276. 10.4	276. 10.4	276. 10.4	276. 10.4	276. 10.4	276. 10.4	276. 10.4
292. 10.4	293. 10.4	293. 10.4	293. 10.4	293. 10.4	293. 10.4	293. 10.4	293. 10.4
302. 10.4	303. 10.4	303. 10.4	303. 10.4	303. 10.4	303. 10.4	303. 10.4	303. 10.4
323. 10.4	324. 10.4	324. 10.4	324. 10.4	324. 10.4	324. 10.4	324. 10.4	324. 10.4
342. 10.4	343. 10.4	343. 10.4	343. 10.4	343. 10.4	343. 10.4	343. 10.4	343. 10.4
362. 10.4	363. 10.4	363. 10.4	363. 10.4	363. 10.4	363. 10.4	363. 10.4	363. 10.4
382. 10.4	383. 10.4	383. 10.4	383. 10.4	383. 10.4	383. 10.4	383. 10.4	383. 10.4
402. 10.4	403. 10.4	403. 10.4	403. 10.4	403. 10.4	403. 10.4	403. 10.4	403. 10.4
422. 10.4	423. 10.4	423. 10.4	423. 10.4	423. 10.4	423. 10.4	423. 10.4	423. 10.4
442. 10.4	443. 10.4	443. 10.4	443. 10.4	443. 10.4	443. 10.4	443. 10.4	443. 10.4
462. 10.4	463. 10.4	463. 10.4	463. 10.4	463. 10.4	463. 10.4	463. 10.4	463. 10.4
482. 10.4	483. 10.4	483. 10.4	483. 10.4	483. 10.4	483. 10.4	483. 10.4	483. 10.4
502. 10.4	503. 10.4	503. 10.4	503. 10.4	503. 10.4	503. 10.4	503. 10.4	503. 10.4
522. 10.4	523. 10.4	523. 10.4	523. 10.4	523. 10.4	523. 10.4	523. 10.4	523. 10.4
542. 10.4	543. 10.4	543. 10.4	543. 10.4	543. 10.4	543. 10.4	543. 10.4	543. 10.4
562. 10.4	563. 10.4	563. 10.4	563. 10.4	563. 10.4	563. 10.4	563. 10.4	563. 10.4
582. 10.4	583. 10.4	583. 10.4	583. 10.4	583. 10.4	583. 10.4	583. 10.4	583. 10.4
602. 10.4	603. 10.4	603. 10.4	603. 10.4	603. 10.4	603. 10.4	603. 10.4	603. 10.4
622. 10.4	623. 10.4	623. 10.4	623. 10.4	623. 10.4	623. 10.4	623. 10.4	623. 10.4
642. 10.4	643. 10.4	643. 10.4	643. 10.4	643. 10.4	643. 10.4	643. 10.4	643. 10.4
662. 10.4	663. 10.4	663. 10.4	663. 10.4	663. 10.4	663. 10.4	663. 10.4	663. 10.4
682. 10.4	683. 10.4	683. 10.4	683. 10.4	683. 10.4	683. 10.4	683. 10.4	683. 10.4
702. 10.4	703. 10.4	703. 10.4	703. 10.4	703. 10.4	703. 10.4	703. 10.4	703. 10.4
722. 10.4	723. 10.4	723. 10.4	723. 10.4	723. 10.4	723. 10.4	723. 10.4	723. 10.4
742. 10.4	743. 10.4	743. 10.4	743. 10.4	743. 10.4	743. 10.4	743. 10.4	743. 10.4
762. 10.4	763. 10.4	763. 10.4	763. 10.4	763. 10.4	763. 10.4	763. 10.4	763. 10.4
782. 10.4	783. 10.4	783. 10.4	783. 10.4	783. 10.4	783. 10.4	783. 10.4	783. 10.4
802. 10.4	803. 10.4	803. 10.4	803. 10.4	803. 10.4	803. 10.4	803. 10.4	803. 10.4
822. 10.4	823. 10.4	823. 10.4	823. 10.4	823. 10.4	823. 10.4	823. 10.4	823. 10.4
842. 10.4	843. 10.4	843. 10.4	843. 10.4	843. 10.4	843. 10.4	843. 10.4	843. 10.4
862. 10.4	863. 10.4	863. 10.4	863. 10.4	863. 10.4	863. 10.4	863. 10.4	863. 10.4
882. 10.4	883. 10.4	883. 10.4	883. 10.4	883. 10.4	883. 10.4	883. 10.4	883. 10.4
902. 10.4	903. 10.4	903. 10.4	903. 10.4	903. 10.4	903. 10.4	903. 10.4	903. 10.4
922. 10.4	923. 10.4	923. 10.4	923. 10.4	923. 10.4	923. 10.4	923. 10.4	923. 10.4
942. 10.4	943. 10.4	943. 10.4	943. 10.4	943. 10.4	943. 10.4	943. 10.4	943. 10.4
962. 10.4	963. 10.4	963. 10.4	963. 10.4	963. 10.4	963. 10.4	963. 10.4	963. 10.4
982. 10.4	983. 10.4	983. 10.4	983. 10.4	983. 10.4	983. 10.4	983. 10.4	983. 10.4
1002. 10.4	1003. 10.4	1003. 10.4	1003. 10.4	1003. 10.4	1003. 10.4	1003. 10.4	1003. 10.4

DATE 650908	DATE 651026	DATE 651220	DATE 660124	DATE 660326	DATE 660426	DATE 661103	DATE 670110
SRVY 51	SRVY 42	SRVY 43	SRVY 52	SRVY 45	SRVY 46	SRVY 47	SRVY 48
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
50. 8.9	0. 10.1	0. 10.1	0. 10.2	200. 8.7	100. 9.5	0. 10.4	0. 10.3
100. 7.6	51. 9.1	50. 9.1	50. 9.2	200. 8.7	100. 9.5	49. 9.6	51. 9.7
252. 10.2	151. 10.2	150. 10.2	150. 10.2	351. 8.7	200. 9.1	100. 9.6	100. 9.7
582. 1.8	201. 9.4	191. 10.5	191. 10.5	352. 8.7	49. 9.9	151. 10.3	151. 10.3
603. 1.1	252. 8.4	201. 9.7	201. 9.7	402. 8.4	25. 9.5	166. 10.3	201. 9.9
603. 1.1	252. 8.4	245. 8.4	250. 8.0	403. 8.1	351. 8.6	201. 8.2	219. 5.4
603. 1.1	301. 3.4	245. 7.6	250. 8.0	403. 8.1	402. 8.6	252. 8.3	219. 5.4
604. 1.8	332. 1.8	302. 3.4	351. 2.0	503. 8.1	10. 1.0	302. 1.8	277. 6.0
609. 2.1	403. 8.5	352. 2.9	402. 1.0	503. 8.1	10. 1.0	352. 1.8	302. 2.7
	433. 8.0	403. 1.0	453. 1.1		402. 1.9	403. 1.8	302. 2.7
		433. 8.0	453. 1.1		402. 1.9	432. 1.8	302. 2.7
		453. 8.0	503. 1.0		402. 1.9	432. 1.8	302. 2.7
		503. 8.0	552. 1.0		402. 1.9	432. 1.8	302. 2.7

DATE 670503	DATE 670915	DATE 670919	DATE 671213	DATE 680115	DATE 680184	DATE 680130	DATE 680208
SRVY 49	SRVY 56	SRVY 51	SRVY 52	SRVY 53	SRVY 54	SRVY 55	SRVY 56
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
0. 10.6	0. 10.4	0. 10.1	50. 9.0	0. 10.5	0. 10.5	0. 10.5	0. 10.5
51. 9.0	50. 9.0	50. 10.1	50. 9.6	50. 9.0	50. 9.0	50. 9.1	50. 9.0
101. 9.3	100. 9.4	100. 9.4	150. 10.1	100. 9.5	100. 9.7	100. 9.7	100. 9.7
151. 10.3	151. 10.4	150. 10.2	171. 10.1	142. 10.2	141. 10.2	150. 10.2	141. 10.1
176. 10.0	176. 9.7	176. 8.6	173. 7.8	145. 6.2	145. 7.0	150. 7.0	145. 6.4
161. 7.8	161. 7.1	160. 5.6	200. 5.7	150. 6.2	150. 6.5	200. 5.2	150. 6.4
227. 3.1	201. 6.3	250. 4.9	251. 3.2	200. 5.7	200. 4.6	200. 4.6	200. 5.0
277. 1.9	251. 5.4	251. 1.0	251. 1.0	250. 5.7	250. 4.6	250. 4.6	250. 5.0
302. 1.1	301. 3.9	351. 1.3	351. 1.3	300. 1.2	300. 1.3	350. 1.2	300. 1.4
343. 1.1	401. 3.3	451. 1.3	400. 1.2	350. 1.2	350. 1.3	400. 1.2	350. 1.4
371. 0.0	450. 1.1	500. 1.1	450. 1.2	400. 1.0	400. 1.3	450. 1.2	400. 1.4
403. 1.5	500. 1.1	500. 1.1	500. 1.2	450. 1.0	450. 1.3	500. 1.2	450. 1.4
502. 1.5	500. 1.1	500. 1.1	500. 1.2	450. 1.0	450. 1.3	500. 1.2	450. 1.4
502. 1.5	500. 1.1	500. 1.1	500. 1.2	450. 1.0	450. 1.3	500. 1.2	450. 1.4

DATE 690226 SRVY 71 TIME 1200	DATE 690305 SRVY 74 TIME 1200	DATE 690312 SRVY 75 TIME 1200	DATE 690319 SRVY 76 TIME 1200	DATE 690325 SRVY 78 TIME 1200	DATE 691023 SRVY 79 TIME 1200	DATE 691120 SRVY 80 TIME 1200	DATE 691216 SRVY 81 TIME 1200
0 10.4 50 9.0 98 9.3 100 7.6 150 5.6 200 3.9 250 1.6 300 0.0 350 -1.4 400 -2.1 450 -2.1	0 10.4 50 8.7 97 9.0 100 7.9 150 5.8 200 4.9 250 1.9 300 1.2 350 -1.3 400 -2.3 450 -3.4 500 -3.9 550 -3.7 600 -2.5	0 10.4 50 9.0 98 9.2 100 8.2 150 5.9 200 4.2 250 1.9 300 1.1 350 -1.1 400 -1.9 450 -3.0 500 -3.0	0 10.7 50 8.9 98 9.0 100 7.8 150 5.7 200 4.5 250 1.8 300 1.3 350 -0.0 400 -2.5	0 10.2 50 8.9 98 9.3 100 8.2 150 6.7 200 5.5 250 3.2 300 1.4 350 0.0 400 -1.4 450 -1.4	0 10.3 50 8.9 98 9.1 100 7.4 150 6.4 200 5.2 250 3.7 300 2.1 350 1.4 400 1.2 450 0.7 500 -2.4 550 -4.3 600 -5.3	0 10.3 50 8.9 98 9.0 100 8.2 150 6.4 200 5.2 250 3.7 300 2.1 350 1.4 400 1.2 450 0.7 500 -2.4 550 -4.3 600 -5.3	0 10.3 50 9.0 97 9.1 100 8.2 150 6.4 200 5.2 250 3.4 300 1.9 350 1.0 400 0.9 450 0.9 500 0.8
DATE 700114 SRVY 82 TIME 1200	DATE 700121 SRVY 83 TIME 1200	DATE 700128 SRVY 84 TIME 1200	DATE 700204 SRVY 85 TIME 1200	DATE 700211 SRVY 86 TIME 1200	DATE 700218 SRVY 87 TIME 1200	DATE 700225 SRVY 88 TIME 1200	DATE 700308 SRVY 89 TIME 1200
0 10.5 50 8.9 91 9.1 100 8.5 150 7.0 200 5.0 250 4.2 300 2.4 350 0.4 400 -1.0 450 -2.4 500 -3.1	0 10.7 50 9.3 92 9.3 100 8.7 150 6.0 200 4.6 250 2.3 300 0.8 350 -1.4 400 -2.7 450 -3.1	0 10.5 50 9.0 91 9.1 100 8.4 150 6.8 200 4.3 250 2.0 300 0.6 350 -0.9 400 -2.0	0 10.3 50 8.9 90 9.0 92 8.9 100 8.6 150 7.6 200 6.9 250 5.9 300 4.3 350 3.3 400 1.6 450 1.1 500 0.9	0 10.5 50 9.1 91 9.1 100 8.4 150 5.3 200 3.1 250 1.0 300 0.7 350 -1.8 400 -2.5 450 -2.5	0 10.6 50 9.0 90 8.6 125 7.1 150 5.9 175 5.1 200 3.8 250 1.8 300 0.2 350 -1.2 400 -1.7 450 -1.9 500 -1.9	0 10.4 50 8.6 90 8.8 100 8.3 150 6.2 180 5.5 200 4.7 250 3.6 300 2.7 350 1.5 400 0.8 450 -0.4	0 10.3 50 8.9 90 9.0 100 8.3 150 6.7 175 5.9 200 4.6 250 3.2 300 1.8 350 0.2 400 -1.3 450 -2.0

DATE 700311	DATE 700318	DATE 700426	DATE 701015	DATE 701106	DATE 701209	DATE 701210
SRVY 90	SRVY 92	SRVY 91	SRVY 94	SRVY 95	SRVY 96	SRVY 97
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
-----	-----	-----	-----	-----	-----	-----
0. 10.4	0. 10.5	0. 10.3	0. 10.2	0. 10.4	0. 10.4	0. 10.4
50. 9.0	50. 8.8	50. 8.9	50. 8.9	50. 8.8	50. 8.9	50. 8.9
93. 9.0	87. 9.0	68. 8.9	100. 8.2	86. 9.0	100. 7.9	14. 8.9
100. 8.8	100. 8.1	115. 7.9	100. 8.2	100. 8.2	100. 7.9	50. 8.9
150. 8.8	115. 8.3	150. 7.9	150. 8.6	150. 7.7	100. 7.9	50. 8.9
200. 8.8	171. 8.0	171. 8.0	150. 8.6	150. 7.7	100. 7.9	100. 7.9
250. 8.8	223. 7.9	169. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
300. 8.8	250. 7.9	200. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
350. 8.8	280. 7.9	222. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
400. 8.8	300. 7.9	244. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
450. 8.8	320. 7.9	266. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
500. 8.8	340. 7.9	288. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
550. 8.8	360. 7.9	310. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
600. 8.8	380. 7.9	332. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
650. 8.8	400. 7.9	354. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
700. 8.8	420. 7.9	376. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
750. 8.8	440. 7.9	398. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
800. 8.8	460. 7.9	420. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
850. 8.8	480. 7.9	442. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
900. 8.8	500. 7.9	464. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
950. 8.8	520. 7.9	486. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9
1000. 8.8	540. 7.9	508. 8.8	150. 8.6	150. 7.7	100. 7.9	100. 7.9

DATE 710113	DATE 710209	DATE 710311	DATE 710412	DATE 710607	DATE 710816	DATE 711004	DATE 711213
SRVY 98	SRVY 99	SRVY 100	SRVY 101	SRVY 102	SRVY 103	SRVY 104	SRVY 105
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
-----	-----	-----	-----	-----	-----	-----	-----
0. 10.5	0. 10.4	0. 10.5	0. 10.4	0. 10.4	0. 10.4	0. 10.4	0. 10.4
50. 8.8	50. 8.9	50. 8.8	50. 8.9	50. 8.9	50. 8.9	50. 8.8	50. 8.9
100. 8.0	100. 8.0	100. 8.0	100. 8.1	100. 8.1	100. 8.0	100. 8.0	100. 8.1
150. 7.8	150. 7.8	150. 7.8	150. 7.8	150. 7.8	150. 7.7	150. 7.7	150. 7.7
200. 7.9	200. 7.9	200. 7.9	200. 7.9	200. 7.9	200. 7.8	200. 7.8	200. 7.8
250. 7.9	250. 7.9	250. 7.9	250. 7.9	250. 7.9	250. 7.8	250. 7.8	250. 7.8
300. 7.9	300. 7.9	300. 7.9	300. 7.9	300. 7.9	300. 7.8	300. 7.8	300. 7.8
350. 7.9	350. 7.9	350. 7.9	350. 7.9	350. 7.9	350. 7.8	350. 7.8	350. 7.8
400. 7.9	400. 7.9	400. 7.9	400. 7.9	400. 7.9	400. 7.8	400. 7.8	400. 7.8
450. 7.9	450. 7.9	450. 7.9	450. 7.9	450. 7.9	450. 7.8	450. 7.8	450. 7.8
500. 7.9	500. 7.9	500. 7.9	500. 7.9	500. 7.9	500. 7.8	500. 7.8	500. 7.8
550. 7.9	550. 7.9	550. 7.9	550. 7.9	550. 7.9	550. 7.8	550. 7.8	550. 7.8
600. 7.9	600. 7.9	600. 7.9	600. 7.9	600. 7.9	600. 7.8	600. 7.8	600. 7.8
650. 7.9	650. 7.9	650. 7.9	650. 7.9	650. 7.9	650. 7.8	650. 7.8	650. 7.8
700. 7.9	700. 7.9	700. 7.9	700. 7.9	700. 7.9	700. 7.8	700. 7.8	700. 7.8
750. 7.9	750. 7.9	750. 7.9	750. 7.9	750. 7.9	750. 7.8	750. 7.8	750. 7.8
800. 7.9	800. 7.9	800. 7.9	800. 7.9	800. 7.9	800. 7.8	800. 7.8	800. 7.8
850. 7.9	850. 7.9	850. 7.9	850. 7.9	850. 7.9	850. 7.8	850. 7.8	850. 7.8
900. 7.9	900. 7.9	900. 7.9	900. 7.9	900. 7.9	900. 7.8	900. 7.8	900. 7.8
950. 7.9	950. 7.9	950. 7.9	950. 7.9	950. 7.9	950. 7.8	950. 7.8	950. 7.8
1000. 7.9	1000. 7.9	1000. 7.9	1000. 7.9	1000. 7.9	1000. 7.8	1000. 7.8	1000. 7.8

DATE 720110	DATE 720218	DATE 720222	DATE 720317	DATE 720410	DATE 720821	DATE 721020	DATE 721208
SRVY 116	SRVY 113	SRVY 106	SRVY 109	SRVY 116	SRVY 111	SRVY 112	SRVY 113
TIME 1200	TIME 1400	TIME 1200	TIME 1200	TIME 1200	TIME 1600	TIME 1000	TIME 1400
0. 10.2	0. 10.8	0. 10.9	0. 10.6	0. 10.8	0. 10.3	0. 10.5	0. 10.7
90. 8.0	15. 7.0	10. 9.3	25. 8.7	50. 8.8	25. 8.9	50. 8.6	50. 8.4
100. 8.0	50. 8.0	50. 8.7	50. 8.8	100. 8.0	50. 8.7	100. 8.2	100. 7.7
150. 7.7	100. 8.0	80. 8.0	100. 7.9	150. 7.3	100. 7.9	150. 7.6	150. 6.4
200. 9.3	150. 7.0	100. 7.2	150. 7.2	200. 5.1	150. 7.4	200. 6.1	175. 6.7
250. 5.3	180. 8.0	180. 6.5	180. 6.5	250. 3.2	200. 6.2	250. 2.8	200. 2.9
300. 2.8	200. 6.0	250. 4.1	200. 5.5	300. 1.4	250. 5.3	300. 2.5	250. 2.0
350. 1.4	250. 4.0	300. 1.7	250. 3.1	350. .0	300. 2.5	350. .0	300. .0
400. -1.0	300. 2.0	350. 0.0	300. 1.2	400. -1.0	350. 2.2	400. -1.1	350. -1.0
450. -1.0	350. .0	400. -1.0	375. -1.0	450. -1.0	400. -2.1	450. -1.0	400. -1.1
	400. -1.0						

DATE 730105	DATE 730216	DATE 730216	DATE 730225	DATE 730405	DATE 730418
SRVY 114	SRVY 115	SRVY 116	SRVY 117	SRVY 116	SRVY 119
TIME 1000	TIME 1000	TIME 900	TIME 800	TIME 1300	TIME 1200
0. 10.7	0. 10.3	0. 10.4	17. 9.2	0. 11.0	0. 11.1
50. 8.6	50. 8.8	50. 8.6	50. 8.6	15. 9.2	15. 9.1
100. 8.0	100. 8.9	100. 7.9	100. 8.2	50. 8.6	50. 8.6
150. 7.8	150. 8.1	150. 8.8	150. 8.2	100. 7.0	100. 7.2
200. 5.4	200. 8.7	200. 8.8	200. 7.6	150. 7.6	150. 7.1
250. 7.6	250. 8.2	250. 8.1	250. 2.8	200. 4.5	200. 4.7
300. 2.0	300. 7.8	300. 7.3	300. .0	250. 1.8	250. 2.5
350. .0	350. 7.8	350. -1.3	400. -1.6	300. .2	300. .7
400. -1.0	400. -1.0	400. -1.0	415. -2.0	400. -1.3	400. -2.3

DATE 621024	DATE 621101	DATE 621109	DATE 621212	DATE 630109	DATE 630116	DATE 630122	DATE 630130
SRVY 1	SRVY 2	SRVY 3	SRVY 4	SRVY 5	SRVY 6	SRVY 7	SRVY 8
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
59. 10.7	71. 10.7	99. 10.0	65. 10.1	-1. 10.8	-1. 10.8	277. 5.9	-1. 10.6
44. 10.5	93. 10.6	121. 10.3	121. 9.9	2. 10.6	28. 9.9	300. 3.3	23. 10.0
137. 7.7	148. 9.8	114. 10.1	121. 9.7	2. 10.0	44. 10.5	300. 3.0	50. 10.6
236. 6.6	203. 9.2	164. 8.0	121. 9.7	49. 11.6	60. 10.3	435. -0.1	75. 10.5
326. 6.3	316. 6.8	275. 7.0	121. 9.7	72. 10.4	100. 10.2	431. -0.7	100. 10.1
374. 2.9	363. 3.2	372. 4.2	206. 2.2	99. 10.0	115. 10.4	478. -0.2	150. 9.2
425. 2.7	401. 1.0	364. 2.8	408. -2.6	109. 10.5	124. 9.8	478. -0.2	200. 8.0
581. -8.2	488. -11.4	364. 2.1	545. -2.1	114. 10.4	150. 9.3	478. -0.2	225. 7.5
		423. -3.3	619. -3.6	123. 9.6	176. 8.8	478. -0.2	275. 5.8
		519. -8.8		150. 9.4	200. 8.2	478. -0.2	300. 6.8
				174. 8.9	225. 7.5	478. -0.2	325. 3.8
				199. 8.1	252. 6.6	478. -0.2	351. 3.0
				225. 7.7	289. 5.5	478. -0.2	375. 2.6
				240. 6.7	344. 2.9	478. -0.2	425. 0.8
				279. 5.9	401. 0.9	478. -0.2	450. -0.1
				300. 5.0	442. -0.1	478. -0.2	501. 9.6
				350. 2.9	517. -0.3	478. -0.2	525. -0.1
				400. 0.9	580. -0.2	478. -0.2	
				478. -0.2	619. -3.6	478. -0.2	
				500. -1.9		478. -0.2	

DATE 630205	DATE 630213	DATE 630221	DATE 630227	DATE 630307	DATE 630313	DATE 630321	DATE 630402
SRVY 9	SRVY 10	SRVY 11	SRVY 12	SRVY 13	SRVY 14	SRVY 15	SRVY 16
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
69. 10.8	278. 5.8	-12. 10.6	174. 6.8	25. 10.0	-1. 10.5	99. 10.1	206. 8.1
48. 10.0	300. 2.9	75. 10.0	224. 7.5	40. 11.1	25. 10.1	99. 9.5	225. 7.7
151. 9.0	376. 2.8	502. 10.7	259. 7.0	150. 10.6	50. 10.6	122. 9.2	250. 5.7
175. 8.9	406. 2.1	100. 10.1	300. 6.7	100. 10.0	100. 10.1	150. 8.5	290. 3.8
200. 7.9	426. 0.4	100. 10.1	326. 6.3	130. 9.5	173. 8.6	150. 8.5	315. 3.5
230. 6.4	451. -0.8	225. 7.8	350. 2.9	174. 6.8	201. 8.0	275. 5.9	375. 2.1
276. 5.9	476. -11.1	225. 6.9	375. 1.4	200. 6.2	225. 7.4	301. 5.3	400. 1.1
300. 4.8	499. 3.0	249. 5.0	400. 0.0	224. 7.8	250. 6.6	325. 4.3	425. -0.1
350. 3.3	550. 3.1	350. 1.1	425. -0.5	250. 6.8	276. 5.9	349. 2.9	450. -0.1
375. 2.0	600. 1.3	400. 1.3	451. -0.2	281. 5.7	301. 5.0	376. 2.1	475. -0.1
400. 1.0	650. -0.1	450. -0.1	500. -1.7	301. 4.9	350. 2.8	400. 1.1	500. -0.1
425. -0.3	675. -0.2	500. -1.4	550. -3.5	351. 3.1	401. 0.8	425. -0.3	525. -0.1
451. -0.8				400. 1.0	451. -0.5	450. -0.5	
476. -0.9				451. -0.5	475. -0.1		
				475. -0.1			

[illegible]

DATE 680609	DATE 680627	DATE 680628	DATE 680631	DATE 680625	DATE 681203	DATE 680120	DATE 680426
SRVY 33	SRVY 34	SRVY 35	SRVY 34	SRVY 37	SRVY 38	SRVY 39	SRVY 40
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
50. 10.8	-1. 10.8	0. 10.8	0. 10.4	50. 10.2	0. 10.4	50. 10.1	0. 10.8
100. 10.0	40. 10.8	50. 10.5	101. 10.5	101. 9.9	10. 10.4	100. 9.9	50. 10.5
151. 9.0	100. 10.2	101. 9.1	152. 9.3	152. 8.6	101. 10.0	151. 8.7	100. 10.1
201. 7.9	151. 9.1	151. 8.1	202. 8.4	202. 8.4	151. 9.4	201. 8.7	151. 9.4
251. 6.8	201. 8.4	201. 7.4	251. 7.1	252. 6.9	151. 8.6	252. 8.0	201. 8.9
301. 5.9	252. 7.6	252. 6.6	302. 6.1	302. 5.0	201. 7.0	302. 5.7	251. 7.3
351. 4.7	302. 6.0	302. 5.0	352. 6.1	352. 3.3	302. 5.7	352. 4.0	301. 6.1
401. 3.6	352. 5.8	352. 4.8	403. 6.0	403. 1.9	352. 4.3	404. 2.9	352. 5.4
451. 1.7	403. 5.0	403. 4.0	453. 5.9	453. 0.7	403. 2.6	453. 1.8	403. 2.9
501. 0.0	453. 2.9	453. 1.6	503. 5.1	503. .1	453. .6	504. .8	453. .8
551. .2	504. .1	503. .1	553. .1	553. .1	503. .3	554. .6	504. .3
601. -2.3	553. -1.6	554. -1.3	604. -2.8	604. -2.8	553. -2.2	605. -2.0	554. -2.3
651. -3.7	604. -2.8	604. -2.8			604. -3.0		604. -3.6

DATE 680908	DATE 681028	DATE 681220	DATE 680124	DATE 680329	DATE 680826	DATE 681103	DATE 680118
SRVY 41	SRVY 42	SRVY 43	SRVY 44	SRVY 45	SRVY 46	SRVY 47	SRVY 48
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
50. 10.3	99. 9.9	0. 10.3	0. 9.7	0. 9.7	0. 9.7	50. 10.3	0. 10.6
101. 10.0	150. 9.1	101. 10.1	50. 10.3	50. 10.5	50. 10.3	100. 10.3	50. 10.5
151. 9.6	200. 8.4	101. 9.4	100. 10.0	100. 10.0	101. 10.3	150. 9.7	100. 10.3
201. 8.3	251. 7.1	151. 9.4	151. 9.4	151. 9.4	151. 9.4	201. 8.8	151. 9.8
251. 7.3	301. 6.2	200. 7.3	201. 9.6	201. 9.4	201. 9.3	277. 7.3	281. 7.9
301. 6.0	319. 6.8	240. 6.3	251. 7.0	251. 7.4	251. 7.3	302. 6.3	302. 6.8
351. 5.5	352. 3.6	284. 6.4	302. 5.0	301. 5.5	301. 5.8	330. 4.9	332. 4.3
371. 5.7	402. .8	301. 4.3	352. 3.4	352. 3.4	352. 3.4	402. 1.7	402. 2.6
401. 2.3	453. .0	351. 1.9	402. 1.7	356. 3.4	402. 2.4	452. .5	452. .9
451. 0.0	502. .7	402. .7	452. .4	452. 2.0	452. .4	502. .5	502. .9
501. 0.0	553. -2.0	452. -2.7	503. -2.4	503. 1.0	503. .8	552. -1.8	552. -1.7
551. -2.9	604. -2.6	553. -2.6	603. -2.0	603. -2.2	603. -2.2	604. -2.6	604. -2.6

DATE 070503	DATE 070919	DATE 071213	DATE 080115	DATE 080128	DATE 080130	DATE 080208
SRVY 49	SRVY 51	SRVY 52	SRVY 53	SRVY 54	SRVY 55	SRVY 56
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
-----	-----	-----	-----	-----	-----	-----
0: 10.0	0: 11.4	0: 10.5	-1: 10.8	0: 10.4	-1: 10.8	0: 10.8
50: 10.5	50: 10.4	50: 10.5	50: 11.2	50: 10.7	50: 10.7	49: 10.7
151: 9.9	100: 11.0	100: 10.1	100: 10.1	100: 10.3	100: 10.2	49: 10.2
201: 9.8	150: 9.8	150: 9.8	150: 9.9	149: 9.7	149: 9.7	149: 9.5
251: 7.9	200: 9.2	200: 9.7	200: 8.7	200: 9.4	200: 9.5	200: 7.9
301: 8.6	250: 9.0	250: 9.1	250: 7.3	250: 8.4	250: 7.5	250: 7.9
352: 2.0	300: 2.7	300: 3.6	300: 3.0	300: 4.0	301: 3.7	300: 3.2
402: 2.5	350: 2.2	350: 3.4	350: 1.6	350: 4.1	350: 3.4	350: 2.9
452: 3.2	400: 2.2	401: 1.5	400: 1.6	401: 1.2	400: 1.6	401: 1.0
502: 1.5	450: 1.5	450: 1.5	450: 0.0	449: .7	450: .1	450: 0.0
552: 1.5	500: .15	500: 0.0	499: .14	499: .7	499: .17	499: .1
602: .9	550: .2	550: .2	550: .1	550: .2	550: .2	550: .2
652: .2	600: .2	600: .2	600: .2	600: .2	600: .2	600: .2

DATE 080219	DATE 080221	DATE 080226	DATE 080307	DATE 080313	DATE 080322	DATE 080328
SRVY 57	SRVY 58	SRVY 59	SRVY 60	SRVY 61	SRVY 62	SRVY 63
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
-----	-----	-----	-----	-----	-----	-----
-1: 10.8	-1: 10.8	0: 10.8	0: 10.9	-1: 10.9	0: 10.8	0: 10.5
49: 10.8	50: 10.6	49: 10.6	49: 10.9	50: 10.9	50: 10.1	50: 10.4
100: 10.1	100: 10.1	100: 10.1	100: 10.1	100: 10.1	100: 9.5	100: 9.3
149: 9.4	149: 9.3	150: 9.3	150: 9.3	150: 9.3	150: 9.3	150: 9.3
200: 8.4	200: 8.6	200: 8.6	200: 8.7	200: 8.5	200: 8.8	200: 8.8
250: 7.8	250: 7.7	250: 7.7	250: 7.7	250: 7.8	250: 7.8	250: 7.8
300: 5.2	300: 5.3	300: 5.3	300: 5.1	300: 5.0	300: 6.8	300: 6.8
350: 3.4	350: 3.4	350: 3.4	350: 3.5	350: 2.9	323: 3.1	350: 3.1
400: 1.1	400: 1.2	400: .9	400: 1.1	400: .5	350: 4.1	350: 3.3
450: .1	450: .1	450: .1	450: .2	450: .1	450: 1.3	450: .2
500: .1	500: .1	500: .1	500: .2	500: .1	500: .1	500: .1
550: .1	550: .1	550: .1	550: .2	550: .1	550: .1	550: .1
600: .1	600: .1	600: .1	600: .2	600: .1	600: .1	600: .1

DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
00	10.7	00	10.3	00	10.6	00	10.7	00	10.7	00	10.7
50	10.4	50	10.4	50	10.4	50	10.4	50	10.4	50	10.4
100	10.1	100	10.0	100	10.0	100	10.0	100	10.0	100	10.1
150	9.5	150	9.4	150	9.4	150	9.3	150	9.3	150	9.6
200	9.0	200	8.9	200	8.9	200	8.9	200	8.9	200	9.1
250	7.2	250	7.5	250	7.4	250	7.4	250	7.3	250	7.6
300	4.7	300	5.4	300	5.2	300	4.7	300	4.9	300	5.9
350	2.7	350	3.7	350	3.4	350	2.6	350	3.3	350	3.1
400	1.4	400	1.9	400	1.2	400	1.3	400	1.3	400	1.9
450	0.4	450	0.0	450	1.3	450	0.7	450	0.6	450	1.9
500	-1.9	500	-2.7	500	-1.3	500	-1.6	500	0.0	500	1.1
550	-3.2	550	-3.9	550	-2.7	550	-1.6	550	-1.1	550	-1.1
600	-3.2	600	-3.2	600	-3.4	600	-3.4	600	-3.4	600	-3.2

DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
00	10.7	00	10.7	00	10.7	00	10.7	00	10.7	00	10.7
50	10.4	50	10.4	50	10.4	50	10.4	50	10.4	50	10.4
100	10.1	100	10.0	100	10.0	100	10.0	100	10.0	100	10.1
150	9.5	150	9.6	150	9.3	150	9.3	150	9.3	150	9.3
200	9.0	200	8.9	200	8.9	200	8.9	200	8.9	200	8.9
250	7.2	250	7.5	250	7.4	250	7.3	250	7.3	250	7.5
300	4.7	300	5.4	300	5.2	300	4.9	300	4.9	300	4.9
350	2.7	350	3.7	350	3.4	350	2.6	350	3.3	350	3.1
400	1.4	400	1.9	400	1.2	400	1.3	400	1.3	400	1.9
450	0.4	450	0.0	450	1.3	450	0.7	450	0.6	450	1.9
500	-1.9	500	-2.7	500	-1.3	500	-1.6	500	-1.1	500	-1.1
550	-3.2	550	-3.9	550	-2.7	550	-1.6	550	-1.1	550	-1.1
600	-3.2	600	-3.2	600	-3.4	600	-3.4	600	-3.4	600	-3.2

[illegible][illegible]

DATE 701218	DATE 710113	DATE 710209	DATE 710311	DATE 710412	DATE 710607	DATE 710816	DATE 711008
SRVY 97	SRVY 98	SRVY 99	SRVY 100	SRVY 101	SRVY 102	SRVY 103	SRVY 104
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
0. 10.7	5. 10.7	50. 10.7	50. 10.5	0. 10.7	50. 10.0	50. 10.1	50. 10.3
100. 10.7	100. 10.7	100. 10.1	100. 10.0	50. 10.1	100. 10.2	100. 10.1	100. 10.2
150. 10.7	150. 10.7	150. 9.3	150. 9.2	100. 10.5	150. 9.4	150. 9.2	150. 9.2
200. 10.7	200. 10.7	200. 9.9	200. 8.9	150. 9.2	200. 8.9	200. 8.9	200. 8.9
250. 10.7	250. 10.7	250. 8.0	250. 8.9	200. 8.6	250. 7.0	250. 7.2	250. 6.2
300. 10.7	300. 10.7	300. 9.5	300. 4.1	250. 8.2	300. 5.6	300. 6.8	300. 5.5
350. 10.7	350. 10.7	350. 1.3	350. 5.1	300. 7.2	350. 4.0	350. 1.7	350. 3.4
400. 10.7	400. 10.7	400. 1.1	400. 4.3	350. 4.2	400. 2.4	400. -1.6	400. 1.6
450. 10.7	450. 10.7	450. -1.1	450. 2.0	400. 3.7	450. -1.7	450. -2.3	450. -0.5
500. 10.7	500. 10.7	500. -8.9	500. 4	450. -2.0	500. -2.6	500. -2.3	500. -0.8
550. 10.7	550. 10.7	550. -1.2	550. -1.2	450. -2.4	550. -3.4	550. -2.0	550. -2.0

DATE 711213	DATE 720110	DATE 720222	DATE 720410	DATE 720821	DATE 721020	DATE 721208
SRVY 105	SRVY 106	SRVY 108	SRVY 110	SRVY 111	SRVY 112	SRVY 113
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
90. 10.7	51. 10.5	50. 10.4	50. 10.4	50. 10.4	50. 10.3	50. 10.4
100. 10.2	100. 10.2	100. 10.1	100. 10.1	100. 10.4	100. 10.7	100. 10.7
150. 10.1	150. 9.2	150. 9.0	150. 9.1	150. 9.1	150. 9.2	150. 9.0
200. 8.9	200. 8.9	200. 8.0	200. 8.7	200. 8.7	200. 8.9	200. 8.9
250. 8.2	250. 8.5	250. 6.5	250. 6.8	250. 7.6	250. 7.3	250. 8.0
300. 6.1	300. 6.4	300. 4.8	300. 4.8	300. 7.1	300. 5.2	300. 7.3
350. 3.4	350. 3.1	350. 2.4	350. 4.0	350. 6.6	350. 3.2	350. 4.2
400. 1.0	400. 1.0	400. 0.7	400. 3.1	400. 2.6	400. 1.4	400. 1.8
450. -1.2	450. -1.4	450. -1.1	450. 3.9	450. -1.1	450. -1.6	450. 0.0
500. -2.5	500. -1.9	500. -1.4	450. -2.0	450. -2.2	475. -1.6	475. -2.3

DATE 730103	DATE 730216	DATE 730316	DATE 730325	DATE 730405	DATE 730418
SRVY 114	SRVY 119	SRVY 116	SRVY 117	SRVY 118	SRVY 119
TIME 1100	TIME 1000	TIME 0900	TIME 800	TIME 1300	TIME 1200
50	50	50	50	50	50
10.4	10.7	10.4	10.7	10.6	10.7
100	100	100	100	100	100
10.4	10.3	10.3	10.4	10.4	10.2
180	150	180	150	180	180
200	200	200	200	200	200
8.9	8.9	8.9	8.9	8.9	8.9
223	224	224	224	230	250
230	230	230	230	250	250
7.3	7.3	7.3	7.3	7.6	7.7
240	240	240	240	240	240
340	340	340	340	340	340
2.2	2.2	2.2	2.2	2.4	2.2
350	350	350	350	350	350
400	400	400	400	400	400
450	450	450	450	450	450
-1.2	-1.0	-1.3	-1.4	-1.2	-1.6
450	450	450	450	450	450
-1.2	-2.6	-2.0	-2.2	-3.0	-3.3

DATE 621024	DATE 621101	DATE 621109	DATE 621212	DATE 630109	DATE 630116
SRVY 1	SRVY 2	SRVY 3	SRVY 4	SRVY 5	SRVY 6
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
102	-1	135	33	-1	50
101	10	135	33	10.1	10.1
221	41	277	131	10.2	10.1
240	69	318	180	10.1	10.1
300	110	410	230	10.1	10.1
380	177	482	302	10.1	10.1
430	241	539	350	10.1	10.1
480	339	611	433	10.1	10.1
-2.0	342	512	515	10.1	10.1
	370	1.6	507	10.1	10.1
	430	-1.1	-2.1	10.1	10.1
	480	-1.9	674	10.1	10.1

DATE 630122	DATE 630130
SRVY 7	SRVY 8
TIME 1200	TIME 1200
50	0
10.1	0
150	10.1
180	10.1
200	10.1
225	10.1
251	10.1
266	10.1
300	10.1
328	10.1
350	10.1
376	10.1
401	10.1
431	10.1
450	10.1
501	10.1
531	10.1

DATE 630205	DATE 630213	DATE 630221	DATE 630227	DATE 630307	DATE 630313	DATE 630321	DATE 630402
SRVY 10	SRVY 10	SRVY 11	SRVY 12	SRVY 13	SRVY 14	SRVY 15	SRVY 16
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
230. 5.0	141. 6.0	0.0	7.3	205. 5.0	0. 8.6	176. 5.0	0. 8.0
275. 2.0	150. 6.0	20. 7.3	6.8	225. 5.0	20. 7.2	225. 5.0	6. 8.5
301. 2.0	176. 5.0	40. 7.0	6.9	251. 5.1	50. 6.8	250. 5.3	10. 7.9
325. 1.3	200. 5.0	60. 6.0	7.0	277. 4.0	100. 6.6	278. 4.5	17. 7.7
400. 0.5	227. 5.0	123. 7.4	7.9	300. 3.8	150. 6.8	301. 3.2	50. 6.6
451. 0.9	255. 5.1	131. 6.4	4.8	325. 2.0	175. 5.8	326. 1.9	100. 6.6
	277. 4.2	142. 8.0	5.8	350. 1.8	200. 5.6	351. 1.2	125. 7.5
	300. 3.0	150. 9.0	5.7	401. 0.0	225. 5.0	400. 0.0	150. 6.0
	327. 1.5	174. 7.0	5.0	450. 0.0	250. 4.1	425. 0.0	225. 5.0
	374. 5.0	219. 5.0	5.7		275. 3.1	250. 0.0	250. 0.0
	401. 1.0	246. 5.0	5.7		300. 1.0	275. 4.6	275. 4.6
	431. 0.7	253. 3.1	5.5		326. 1.9	301. 3.5	301. 3.5
	451. 0.9	277. 3.9	4.0		350. 1.3	351. 1.4	351. 1.4
		301. 3.4	4.0		400. 0.2	401. 0.5	401. 0.5
		325. 2.5	0.9		451. 0.2	426. 0.0	426. 0.0
		350. 1.9	0.9			451. 0.5	451. 0.5
		379. 1.8	0.3			475. 0.1	475. 0.1
		399. 0.3					
		425. 0.2					
		450. 0.6					
		476. 0.0					

DATE 630323	DATE 630411	DATE 630507	DATE 630523	DATE 630505
SRVY 17	SRVY 18	SRVY 22	SRVY 23	SRVY 24
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
1. 8.8	0. 8.8	0. 9.0	0. 9.0	126. 7.5
20. 7.3	24. 6.0	25. 7.5	44. 7.0	151. 7.5
50. 6.6	49. 6.0	70. 6.0	176. 6.8	176. 6.8
101. 0.7	101. 0.0	70. 6.0	125. 7.3	224. 3.6
126. 7.0	100. 6.6	100. 6.5	125. 7.3	251. 5.6
151. 6.7	111. 6.6	125. 7.8	150. 7.2	278. 5.8
174. 5.7	111. 6.0	151. 6.8	175. 6.1	300. 4.8
235. 5.9	125. 7.1	175. 5.0	201. 5.7	326. 3.8
254. 5.3	150. 6.6	200. 5.5	223. 5.9	
300. 5.4	172. 5.8	225. 5.0	250. 5.5	
324. 5.0	201. 5.3	250. 5.8	276. 5.9	
350. 1.0	251. 5.4	276. 5.0	302. 5.3	
381. 0.7	276. 5.2	300. 6.0	350. 0.0	
400. 0.0	326. 2.7	326. 5.0	376. 0.0	
	351. 1.0	351. 3.6	426. 0.1	
	401. 0.6	401. 1.0	476. 0.7	
	451. 0.9	450. 0.5		
		476. 0.5		

DATE 651029	DATE 651220	DATE 660124	DATE 660329	DATE 660426	DATE 661103	DATE 670118	DATE 670803
SRVY 42	SRVY 43	SRVY 44	SRVY 45	SRVY 46	SRVY 47	SRVY 48	SRVY 49
TIME 1200	TIME 1800	TIME 1200	TIME 1800	TIME 1800	TIME 1200	TIME 1200	TIME 1200
-51. 6.7	-51. 6.7	50. 7.3	0. 6.2	0. 6.5	0. 7.9	0. 6.3	0. 6.2
0. 6.3	0. 6.0	50. 7.2	50. 7.5	51. 7.5	50. 7.5	50. 7.4	50. 7.0
50. 7.6	50. 7.1	150. 7.0	100. 7.0	100. 7.0	101. 6.9	100. 6.8	100. 6.6
101. 7.4	101. 7.3	201. 6.3	150. 6.9	151. 7.2	150. 6.9	150. 6.9	151. 6.7
151. 6.9	151. 6.9	251. 5.3	201. 6.6	201. 6.6	201. 6.7	201. 6.6	201. 6.7
201. 6.6	201. 6.0	301. 5.3	251. 5.9	251. 5.9	250. 6.5	251. 6.4	251. 6.0
251. 5.7	251. 5.7	352. 6.0	301. 6.2	302. 5.2	302. 6.7	302. 5.8	301. 6.0
251. 5.7	251. 5.1	402. 1.8	352. 6.2	352. 5.0	350. 5.0	351. 5.5	351. 1.9
301. 6.1	301. 5.1	452. 2.5	402. 2.6	402. 3.2	402. 1.9	402. 2.7	402. 1.0
352. 2.5	352. 4.6	503. 6.3	452. 3.4	452. 3.0	452. 3.3	452. 2.8	452. 1.9
402. 1.4	402. 2.9		503. 6.3	503. 6.3	503. 6.3	503. 6.3	503. 6.3
452. 1.9	452. 2.9		552. 6.4	552. 6.4	552. 6.4	552. 6.4	552. 6.4
503. 6.3	503. 6.3		552. 6.4	552. 6.4	552. 6.4	552. 6.4	552. 6.4
552. 6.3	552. 6.3		552. 6.4	552. 6.4	552. 6.4	552. 6.4	552. 6.4
603. 6.3	603. 6.3		552. 6.4	552. 6.4	552. 6.4	552. 6.4	552. 6.4

DATE 670915	DATE 670919	DATE 671213	DATE 680115	DATE 680124	DATE 680130	DATE 680208	DATE 680215
SRVY 50	SRVY 51	SRVY 52	SRVY 53	SRVY 54	SRVY 55	SRVY 56	SRVY 57
TIME 1200	TIME 1800	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
0. 6.1	0. 6.1	0. 7.5	99. 149	0. 8.0	250. 7.4	1. 6.0	0. 8.0
50. 7.1	50. 7.1	50. 7.5	149. 7.0	50. 7.5	300. 7.4	50. 7.5	50. 7.2
100. 6.7	100. 7.0	100. 6.7	200. 7.3	100. 6.9	350. 1.4	100. 6.8	100. 6.7
150. 6.4	150. 6.7	150. 6.9	250. 7.4	150. 6.9	400. 1.2	149. 6.8	149. 6.8
200. 6.9	200. 6.9	200. 7.2	300. 8.5	200. 7.3	450. 1.1	200. 7.1	199. 7.0
250. 6.9	250. 7.0	250. 7.3	350. 1.3	250. 7.3	500. 1.1	250. 7.3	250. 7.1
300. 5.4	300. 5.4	300. 6.6	400. 1.9	300. 4.7	550. 1.0	300. 5.0	300. 5.0
350. 5.9	350. 5.9	350. 8.7	450. 0.0	350. 2.2	600. 1.3	350. 1.3	351. 1.6
400. 2.3	400. 2.3	400. 1.5	500. 1.9	400. 1.2	650. 1.7	400. 1.2	400. 1.6
450. 1.8	450. 1.8	450. 0.7	550. 1.9	450. 1.2	700. 1.3	450. 1.2	450. 1.3
500. 1.8	500. 1.8	500. 0.0	600. 1.9	500. 1.2	750. 1.3	500. 1.2	500. 1.3
550. 1.8	550. 1.8	550. 0.0	650. 1.9	550. 1.2	800. 1.3	550. 1.2	550. 1.3
600. 1.8	600. 1.8	600. 0.0	700. 1.9	600. 1.2	850. 1.3	600. 1.2	600. 1.3
650. 1.8	650. 1.8	650. 0.0	750. 1.9	650. 1.2	900. 1.3	650. 1.2	650. 1.3
700. 1.8	700. 1.8	700. 0.0	800. 1.9	700. 1.2	950. 1.3	700. 1.2	700. 1.3

DATE 681221	DATE 680326	DATE 680307	DATE 680313	DATE 680322	DATE 681007	DATE 681025	DATE 681115
SRVY 55	SRVY 55	SRVY 60	SRVY 61	SRVY 62	SRVY 63	SRVY 64	SRVY 65
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
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0.1	0.1	0.3	0.50	250.	0.	0.	0.
50.	50.	7.1	300.	301.	6.4	50.	50.
100.	100.	100.	350.	1.7	7.0	100.	100.
150.	150.	150.	400.	1.4	7.0	150.	150.
200.	200.	200.	451.	1.3	7.2	200.	200.
250.	250.	251.	500.	0.0	7.0	250.	250.
300.	300.	300.	550.	0.4	3.8	300.	300.
350.	350.	350.	600.	1.0	3.0	350.	350.
400.	400.	400.	650.	1.7	3.0	400.	400.
450.	450.	450.	700.	0.4	3.2	450.	450.
500.	500.	500.		0.0	3.0	500.	500.
550.	550.	550.		0.0	3.0	550.	550.
600.	600.	600.		0.0	3.0	600.	600.
650.	650.	650.		0.0	3.0	650.	650.
700.	700.	700.		0.0	3.0	700.	700.

DATE 681220	DATE 680313	DATE 680322	DATE 680329	DATE 680329	DATE 680329	DATE 680329	DATE 680329
SRVY 66	SRVY 67	SRVY 68	SRVY 69	SRVY 70	SRVY 71	SRVY 72	SRVY 73
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
-----	-----	-----	-----	-----	-----	-----	-----
0.	0.	0.	0.	0.	0.	0.	0.
50.	50.	50.	50.	50.	50.	50.	50.
100.	100.	100.	100.	100.	100.	100.	100.
150.	150.	150.	150.	150.	150.	150.	150.
200.	200.	200.	200.	200.	200.	200.	200.
250.	250.	250.	250.	250.	250.	250.	250.
300.	300.	300.	300.	300.	300.	300.	300.
350.	350.	350.	350.	350.	350.	350.	350.
400.	400.	400.	400.	400.	400.	400.	400.
450.	450.	450.	450.	450.	450.	450.	450.
500.	500.	500.	500.	500.	500.	500.	500.
550.	550.	550.	550.	550.	550.	550.	550.
600.	600.	600.	600.	600.	600.	600.	600.
650.	650.	650.	650.	650.	650.	650.	650.
700.	700.	700.	700.	700.	700.	700.	700.

DATE 000305	DATE 000312	DATE 000319	DATE 000327	DATE 000323	DATE 000303	DATE 001120	DATE 001216
SRVY 74	SRVY 73	SRVY 76	SRVY 77	SRVY 78	SRVY 79	SRVY 80	SRVY 81
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
0. 6.5	0. 8.5	0. 8.5	50. 6.3	0. 6.2	0. 8.3	0. 8.4	0. 8.4
50. 6.7	50. 6.4	50. 6.4	100. 6.7	50. 6.7	50. 6.7	15. 7.5	50. 7.2
100. 6.5	100. 6.4	100. 6.4	150. 6.7	100. 6.7	100. 6.7	30. 6.9	50. 6.9
150. 6.6	150. 6.7	150. 6.7	200. 7.2	150. 6.7	150. 6.7	45. 6.3	100. 6.3
200. 7.5	200. 7.4	200. 7.4	250. 7.3	200. 7.4	200. 7.2	60. 6.2	118. 6.3
250. 7.3	250. 7.4	250. 7.4	300. 5.0	250. 7.3	250. 7.3	75. 6.8	130. 7.0
300. 3.3	300. 4.4	300. 4.5	350. 4.3	300. 6.2	300. 5.9	90. 7.3	150. 6.7
350. 2.3	330. 3.0	330. 3.7	400. 1.1	350. 6.6	350. 6.2	105. 7.6	200. 7.3
400. 1.4	400. 2.4	450. 1.5	450. 1.2	400. 2.9	340. 6.4	120. 7.1	250. 7.3
450. 0.0	450. 2.4	450. 2.4	500. 0.0	480. 1.6	264. 6.8	135. 6.8	276. 7.3
500. -1.9	500. 2.4	500. 2.4	500. 0.3	500. 0.3	400. 3.0	150. 6.9	300. 6.4
550. -3.0					330. 3.0	165. 3.5	350. 5.1
600. -3.3					350. 1.4	180. 4.8	400. 2.8
650. -2.5					400. -1.2	195. 3.2	450. 1.5
700. -2.5					450. -1.9	210. 1.1	500. 0.6
750. -2.5					500. -2.4	225. 0.9	550. -1.0
					550. -2.4	240. 1.1	600. -1.2
					600. -2.4	255. 0.9	650. -1.2
					650. -2.4	270. 0.9	700. -1.2
					700. -2.4	285. 0.9	750. -1.2
					750. -2.4	300. 0.9	800. -1.2
					800. -2.4	315. 0.9	850. -1.2
					850. -2.4	330. 0.9	900. -1.2
					900. -2.4	345. 0.9	950. -1.2
					950. -2.4	360. 0.9	1000. -1.2

DATE 700114			DATE 700121			DATE 700128			DATE 700204			DATE 700211			DATE 700216			DATE 700225			DATE 700304		
SRVY	82	TIME	SRVY	83	TIME	SRVY	84	TIME	SRVY	85	TIME	SRVY	86	TIME	SRVY	87	TIME	SRVY	88	TIME	SRVY	89	TIME
50.	6.8	50.	6.6	50.	6.4	50.	6.4	50.	6.3	50.	6.2	50.	6.2	50.	7.3	50.	6.3	50.	6.3	50.	6.4	50.	6.4
100.	6.0	100.	6.0	100.	7.0	100.	7.0	100.	7.6	100.	7.8	100.	7.8	100.	6.0	100.	7.6	100.	7.6	100.	7.8	100.	7.8
150.	7.4	150.	7.2	150.	7.0	150.	7.0	150.	7.6	150.	7.2	150.	7.2	150.	6.0	150.	7.6	150.	7.6	150.	7.8	150.	7.8
200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2
250.	6.9	250.	6.9	250.	7.1	250.	7.1	250.	7.2	250.	7.2	250.	7.2	250.	7.2	250.	7.2	250.	7.2	250.	7.2	250.	7.2
300.	6.9	300.	7.1	300.	7.1	300.	7.1	300.	7.2	300.	7.2	300.	7.2	300.	7.2	300.	7.2	300.	7.2	300.	7.2	300.	7.2
350.	3.6	350.	3.7	350.	4.6	350.	4.6	350.	4.6	350.	3.6	350.	3.6	350.	2.6	350.	4.6	350.	4.6	350.	4.6	350.	4.6
400.	2.6	400.	3.4	400.	4.0	400.	4.0	400.	4.1	400.	1.1	400.	1.6	400.	2.75	400.	4.0	400.	4.0	400.	4.0	400.	4.0
450.	1.6	450.	1.8	450.	3.0	450.	3.0	450.	2.1	450.	4.4	450.	4.4	450.	2.3	450.	4.4	450.	4.4	450.	4.4	450.	4.4
500.	2.8	500.	3.1	500.	1.2	500.	1.2	500.	2.3	500.	2.3	500.	2.3	500.	2.3	500.	2.3	500.	2.3	500.	2.3	500.	2.3
550.	2.8	550.	3.1	550.	1.6	550.	1.6	550.	2.3	550.	2.3	550.	2.3	550.	2.3	550.	2.3	550.	2.3	550.	2.3	550.	2.3
600.	2.8	600.	3.1	600.	1.6	600.	1.6	600.	2.3	600.	2.3	600.	2.3	600.	2.3	600.	2.3	600.	2.3	600.	2.3	600.	2.3
650.	2.8	650.	3.1	650.	1.6	650.	1.6	650.	2.3	650.	2.3	650.	2.3	650.	2.3	650.	2.3	650.	2.3	650.	2.3	650.	2.3

DATE 700311			DATE 700318			DATE 700426			DATE 700516			DATE 700519			DATE 701210			DATE 701218					
SRVY	90	TIME	SRVY	91	TIME	SRVY	92	TIME	SRVY	93	TIME	SRVY	94	TIME	SRVY	95	TIME	SRVY	96	TIME	SRVY	97	TIME
50.	6.1	50.	6.7	50.	6.2	50.	6.2	50.	6.2	50.	6.2	50.	6.2	50.	6.7	50.	6.7	50.	6.7	50.	6.7	50.	6.7
100.	7.0	100.	7.9	100.	7.4	100.	7.4	100.	7.4	100.	7.4	100.	7.4	100.	6.4	100.	6.4	100.	6.4	100.	6.4	100.	6.4
150.	7.5	150.	7.7	150.	7.1	150.	7.1	150.	7.1	150.	7.1	150.	7.1	150.	6.4	150.	6.4	150.	6.4	150.	6.4	150.	6.4
200.	7.1	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2	200.	7.2
250.	7.5	250.	7.2	250.	7.2	250.	7.2	250.	7.2	250.	7.2	250.	7.2	250.	7.2	250.	7.2	250.	7.2	250.	7.2	250.	7.2
300.	7.4	300.	7.3	300.	7.2	300.	7.2	300.	7.2	300.	7.2	300.	7.2	300.	7.2	300.	7.2	300.	7.2	300.	7.2	300.	7.2
350.	7.4	350.	7.3	350.	7.2	350.	7.2	350.	7.2	350.	7.2	350.	7.2	350.	7.2	350.	7.2	350.	7.2	350.	7.2	350.	7.2
400.	1.7	400.	2.2	400.	2.2	400.	2.2	400.	2.2	400.	2.2	400.	2.2	400.	2.2	400.	2.2	400.	2.2	400.	2.2	400.	2.2
450.	1.7	450.	2.2	450.	2.2	450.	2.2	450.	2.2	450.	2.2	450.	2.2	450.	2.2	450.	2.2	450.	2.2	450.	2.2	450.	2.2
500.	1.8	500.	2.2	500.	2.2	500.	2.2	500.	2.2	500.	2.2	500.	2.2	500.	2.2	500.	2.2	500.	2.2	500.	2.2	500.	2.2
550.	1.8	550.	2.2	550.	2.2	550.	2.2	550.	2.2	550.	2.2	550.	2.2	550.	2.2	550.	2.2	550.	2.2	550.	2.2	550.	2.2

DATE 710113	DATE 710205	DATE 710311	DATE 710412	DATE 710607	DATE 710816	DATE 711004	DATE 711213
SRVY 98	SRVY 99	SRVY 100	SRVY 101	SRVY 102	SRVY 103	SRVY 104	SRVY 105
TIME 1800	TIME 1800	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1800	TIME 1800
0. 7.3	0. 7.4	0. 7.4	0. 6.6	0. 6.6	0. 6.4	0. 6.5	0. 7.2
50. 8.3	50. 8.2	50. 7.8	50. 7.6	50. 7.5	50. 8.4	33. 8.2	50. 8.2
100. 9.3	100. 9.4	100. 9.1	100. 8.2	100. 8.3	100. 8.4	50. 8.4	100. 9.1
150. 7.3	150. 7.2	150. 7.4	150. 7.4	150. 7.4	150. 7.4	100. 8.1	150. 7.4
200. 7.2	200. 7.2	200. 7.3	200. 7.4	200. 7.3	200. 7.3	150. 7.3	200. 7.3
250. 7.2	250. 7.2	250. 7.3	250. 7.4	250. 7.3	250. 7.4	200. 7.4	250. 7.4
300. 6.9	300. 6.9	300. 6.9	300. 7.5	300. 7.5	300. 7.5	250. 7.5	300. 7.5
350. 4.7	350. 4.7	350. 4.7	350. 3.5	350. 3.5	350. 3.5	300. 6.5	350. 7.1
400. 3.9	400. 3.9	400. 3.9	350. 3.4	350. 3.4	350. 3.4	350. 6.5	400. 6.6
450. 3.9	450. 3.9	450. 3.9	350. 3.4	350. 3.4	350. 3.4	400. 7.1	450. 6.6
500. 1.9	500. 1.9	500. 1.9	350. 3.4	350. 3.4	350. 3.4	450. 7.1	500. 3.5
550. 1.9	550. 1.9	550. 1.9	350. 3.4	350. 3.4	350. 3.4	500. 7.1	550. 3.5
600. 1.9	600. 1.9	600. 1.9	350. 3.4	350. 3.4	350. 3.4	550. 7.1	600. 3.5
650. 1.9	650. 1.9	650. 1.9	350. 3.4	350. 3.4	350. 3.4	600. 7.1	650. 3.5
700. 1.9	700. 1.9	700. 1.9	350. 3.4	350. 3.4	350. 3.4	650. 7.1	700. 3.5
750. 1.9	750. 1.9	750. 1.9	350. 3.4	350. 3.4	350. 3.4	700. 7.1	750. 3.5
800. 1.9	800. 1.9	800. 1.9	350. 3.4	350. 3.4	350. 3.4	750. 7.1	800. 3.5
850. 1.9	850. 1.9	850. 1.9	350. 3.4	350. 3.4	350. 3.4	800. 7.1	850. 3.5
900. 1.9	900. 1.9	900. 1.9	350. 3.4	350. 3.4	350. 3.4	850. 7.1	900. 3.5
950. 1.9	950. 1.9	950. 1.9	350. 3.4	350. 3.4	350. 3.4	900. 7.1	950. 3.5
1000. 1.9	1000. 1.9	1000. 1.9	350. 3.4	350. 3.4	350. 3.4	950. 7.1	1000. 3.5

DATE 720110	DATE 720216	DATE 720322	DATE 720417	DATE 720610	DATE 720821	DATE 721020	DATE 721208
SRVY 106	SRVY 107	SRVY 108	SRVY 109	SRVY 110	SRVY 111	SRVY 112	SRVY 113
TIME 1800	TIME 1800	TIME 1800	TIME 1800	TIME 1200	TIME 1500	TIME 1100	TIME 1800
0. 7.4	0. 7.4	0. 7.1	0. 8.0	0. 7.4	0. 6.5	0. 7.7	0. 6.3
50. 8.4	50. 8.3	50. 8.0	50. 9.3	50. 8.4	50. 7.7	50. 7.5	50. 8.4
100. 8.0	100. 8.2	100. 7.9	100. 9.4	100. 8.4	100. 8.5	100. 8.2	100. 7.8
150. 7.3	150. 7.4	150. 7.2	150. 9.4	150. 7.3	150. 8.2	150. 7.3	150. 7.3
200. 7.1	200. 7.4	200. 7.2	200. 9.4	200. 7.1	200. 7.3	200. 7.4	200. 7.5
250. 6.9	250. 7.3	250. 7.4	250. 9.3	250. 7.3	250. 7.0	250. 7.6	250. 7.5
300. 6.9	300. 7.3	300. 7.2	300. 9.1	300. 7.0	300. 6.7	300. 7.0	300. 7.5
350. 4.7	350. 4.7	350. 4.7	350. 8.7	350. 4.7	350. 6.7	350. 7.0	350. 5.5
400. 3.6	400. 3.6	400. 3.6	350. 8.2	400. 3.6	350. 5.3	400. 7.0	400. 3.0
450. 3.6	450. 3.6	450. 3.6	350. 8.2	450. 3.6	350. 5.3	450. 7.0	450. 3.0
500. 1.1	500. 1.1	500. 1.1	350. 8.2	500. 1.1	350. 5.3	500. 7.0	500. 3.0
550. 1.1	550. 1.1	550. 1.1	350. 8.2	550. 1.1	350. 5.3	550. 7.0	550. 3.0
600. 1.1	600. 1.1	600. 1.1	350. 8.2	600. 1.1	350. 5.3	600. 7.0	600. 3.0
650. 1.1	650. 1.1	650. 1.1	350. 8.2	650. 1.1	350. 5.3	650. 7.0	650. 3.0
700. 1.1	700. 1.1	700. 1.1	350. 8.2	700. 1.1	350. 5.3	700. 7.0	700. 3.0
750. 1.1	750. 1.1	750. 1.1	350. 8.2	750. 1.1	350. 5.3	750. 7.0	750. 3.0
800. 1.1	800. 1.1	800. 1.1	350. 8.2	800. 1.1	350. 5.3	800. 7.0	800. 3.0
850. 1.1	850. 1.1	850. 1.1	350. 8.2	850. 1.1	350. 5.3	850. 7.0	850. 3.0
900. 1.1	900. 1.1	900. 1.1	350. 8.2	900. 1.1	350. 5.3	900. 7.0	900. 3.0
950. 1.1	950. 1.1	950. 1.1	350. 8.2	950. 1.1	350. 5.3	950. 7.0	950. 3.0
1000. 1.1	1000. 1.1	1000. 1.1	350. 8.2	1000. 1.1	350. 5.3	1000. 7.0	1000. 3.0

DATE 730105	DATE 730216	DATE 730316	DATE 730425	DATE 730405	DATE 730418
SRVY 114	SRVY 115	SRVY 116	SRVY 117	SRVY 118	SRVY 119
TIME 1100	TIME 1100	TIME 1000	TIME 1000	TIME 1800	TIME 1300
0 8.2	0 8.2	0 8.0	0 8.1	0 8.0	0 7.9
50 8.6	50 8.6	50 8.2	50 8.2	50 8.1	50 8.0
100 8.1	100 7.9	100 7.9	100 7.9	100 7.9	100 7.8
150 7.4	150 7.3	150 7.3	150 7.6	150 7.7	150 7.8
200 7.7	200 7.6	200 7.3	190 7.7	191 7.6	185 8.0
250 7.8	222 7.9	225 7.8	250 2.4	400 6.8	250 3.9
300 4.5	224 7.8	250 3.7	300 0.0	450 3.6	300 2.4
350 2.9	290 5.5	300 3.0	317 1.2	350 1.5	350 2.1
400 1.5	300 2.8	350 1.0	340 0.8	350 1.2	400 1.3
450 0.4	320 1.8	400 0.1	350 0.3	400 0.7	450 0.8
500 0.4	350 1.5	450 0.6	400 0.7	450 0.8	500 0.8
550 -1.4	490 -0.2	500 -2.1	500 -1.7	500 -3.3	550 -2.8
	500 -1.0	900 -1.6	900 -1.6		

DATE 621024	DATE 621101	DATE 621109	DATE 621212	DATE 630109	DATE 630116
SRVY 1	SRVY 2	SRVY 3	SRVY 4	SRVY 5	SRVY 6
TIME 1200	TIME 1800	TIME 1200	TIME 1200	TIME 1200	TIME 1200
51 7.3	14 8.0	174 8.0	9 7.7	1 8.6	31 7.3
45 7.4	62 8.4	164 8.4	20 7.3	7 7.3	50 7.0
137 6.2	136 8.1	164 8.4	9 7.3	20 7.0	99 6.8
205 4.8	166 7.7	237 7.4	121 6.8	50 7.0	124 7.4
235 5.2	219 7.7	237 7.4	6 8.6	6 8.6	136 7.3
265 5.0	270 5.5	345 1.4	126 6.9	7 6.9	173 5.9
337 6.2	331 6.0	484 0.8	2 2.6	7 6.9	151 6.5
375 2.1	371 1.9	511 -8.0	11 3.78	150 6.8	173 5.8
421 -0.1	424 -0.2	511 -8.0	439 -0.6	201 5.9	193 5.3
430 -0.6	486 -0.3	499 -0.6	226 -3.6	201 5.9	227 5.0
508 -2.1	531 -0.2		375 -1.3	375 -1.3	378 -0.6

DATE 630122	DATE 630130
SRVY 7	SRVY 8
TIME 1200	TIME 1200
20 7.4	0 8.4
20 7.0	15 7.7
50 7.0	20 7.5
99 6.8	50 7.0
124 7.3	100 6.8
136 6.9	120 7.4
151 6.5	123 7.4
173 5.8	131 8.4
193 5.3	141 8.1
227 5.0	147 6.5
251 4.4	175 5.9
291 2.3	190 5.5
330 1.2	200 5.7
378 -1.6	224 6.0
	232 6.0
	253 3.2
	271 2.5
	284 2.2
	320 1.8
	350 0.9
	401 0.8
	491 -1.0

DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
49.	10.2	276.	5.3	-1.	18.5	74.	9.4	275.	5.5
100.	8.9	300.	4.7	49.	16.1	100.	8.8	300.	5.0
150.	7.8	350.	3.6	100.	8.8	125.	8.1	300.	5.0
200.	7.0	400.	1.0	124.	6.0	150.	7.7	350.	5.0
225.	6.9	425.	.2	150.	7.8	200.	7.0	375.	1.4
240.	6.1	450.	0.6	174.	7.1	224.	6.8	429.	0.0
270.	5.3	501.	0.18	200.	7.0	240.	6.3	450.	0.0
300.	4.4			225.	6.8	275.	5.5	500.	-1.3
350.	3.5			251.	6.3	300.	4.9		
375.	2.1			324.	5.3	325.	4.3		
400.	1.6			429.	2.9	375.	1.5		
450.	1.8			450.	0.2	400.	1.2		
501.	0.11			480.	0.9	425.	0.2		
				480.	0.9	450.	0.6		
				500.	-1.8	475.	-1.0		
						501.	-2.0		

DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
49.	10.2	276.	5.3	-1.	18.5	74.	9.4	275.	5.5
100.	8.9	300.	4.7	49.	16.1	100.	8.8	300.	5.0
150.	7.8	350.	3.6	100.	8.8	125.	8.1	300.	5.0
200.	7.0	400.	1.0	124.	6.0	150.	7.7	350.	5.0
225.	6.9	425.	.2	150.	7.8	200.	7.0	375.	1.4
240.	6.1	450.	0.6	174.	7.1	224.	6.8	429.	0.0
270.	5.3	501.	0.18	200.	7.0	240.	6.3	450.	0.0
300.	4.4			225.	6.8	275.	5.5	500.	-1.3
350.	3.5			251.	6.3	300.	4.9		
375.	2.1			324.	5.3	325.	4.3		
400.	1.6			429.	2.9	375.	1.5		
450.	1.8			450.	0.2	400.	1.2		
501.	0.11			480.	0.9	425.	0.2		
				480.	0.9	450.	0.6		
				500.	-1.8	475.	-1.0		
						501.	-2.0		

DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
100.	8.8	0.	10.4	250.	6.2	-1.	10.1	-1.	10.1
125.	7.5	49.	10.0	300.	5.5	49.	9.8	49.	10.0
150.	6.8	100.	8.4	350.	3.0	100.	8.6	99.	8.9
200.	6.0	150.	7.4	375.	2.3	150.	7.6	150.	7.8
225.	5.1	200.	6.7	401.	0.8	180.	6.9	200.	6.8
251.	6.0	225.	6.6	425.	-0.2	250.	6.2	225.	6.8
270.	5.6	250.	6.2	450.	-0.1	275.	6.0	250.	6.2
302.	5.8	275.	6.7			301.	5.3	275.	6.0
325.	5.3	300.	6.3			325.	4.2	300.	5.8
350.	1.8	325.	3.4			351.	1.9	325.	4.9
401.	0.8	350.	2.3			375.	0.8	351.	1.5
451.	-1.4	375.	1.4			400.	-0.2	375.	1.5
		400.	1.9			425.	-0.6	400.	1.5
		450.	0.2			450.	-1.7	425.	0.3
		475.	0.11					451.	0.3

DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
100.	8.8	0.	10.4	250.	6.2	-1.	10.1	-1.	10.1
125.	7.5	49.	10.0	300.	5.5	49.	9.8	49.	10.0
150.	6.8	100.	8.4	350.	3.0	100.	8.6	99.	8.9
200.	6.0	150.	7.4	375.	2.3	150.	7.6	150.	7.8
225.	5.1	200.	6.7	401.	0.8	180.	6.9	200.	6.8
251.	6.0	225.	6.6	425.	-0.2	250.	6.2	225.	6.8
270.	5.6	250.	6.2	450.	-0.1	275.	6.0	250.	6.2
302.	5.8	275.	6.7			301.	5.3	275.	6.0
325.	5.3	300.	6.3			325.	4.2	300.	5.8
350.	1.8	325.	3.4			351.	1.9	325.	4.9
401.	0.8	350.	2.3			375.	0.8	351.	1.5
451.	-1.4	375.	1.4			400.	-0.2	375.	1.5
		400.	1.9			425.	-0.6	400.	1.5
		450.	0.2			450.	-1.7	425.	0.3
		475.	0.11					451.	0.3

DATE 630925	DATE 631009	DATE 631114	DATE 640117	DATE 640214	DATE 640312	DATE 640409
SRVY 25	SRVY 26	SRVY 2A	SRVY 30	SRVY 31	SRVY 32	SRVY 33
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
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-35. 11.1 50. 9.9	-45. 11.1 50. 9.9	-35. 11.1 50. 9.9	-35. 11.1 50. 9.9	201. 7.1	0. 10.7	-1. 10.7
-8. 11.1 101. 9.7	-8. 11.1 101. 9.7	-3. 11.1 101. 9.7	-3. 11.1 101. 9.7	250. 5.6	50. 9.7	50. 9.7
0. 10.6 152. 7.0	0. 10.6 152. 7.0	0. 10.6 152. 7.0	0. 10.6 152. 7.0	305. 2.9	101. 9.0	101. 9.0
50. 9.8 202. 6.5	25. 9.9 202. 6.5	25. 9.9 202. 6.5	25. 9.9 202. 6.5	358. 1.0	122. 7.0	122. 7.0
101. 5.7 227. 5.0	50. 10.0 227. 5.0	50. 10.0 227. 5.0	50. 10.0 227. 5.0	408. 0.5	162. 7.1	162. 7.1
152. 7.4 252. 5.0	101. 6.8 252. 5.0	101. 6.8 252. 5.0	101. 6.8 252. 5.0	458. 0.5	202. 7.1	202. 7.1
201. 6.6 277. 2.0	151. 7.5 277. 2.0	151. 7.5 277. 2.0	151. 7.5 277. 2.0	508. 0.5	242. 7.1	242. 7.1
252. 6.1 302. 2.0	201. 7.0 302. 2.0	201. 7.0 302. 2.0	201. 7.0 302. 2.0	558. 0.5	282. 7.1	282. 7.1
302. 5.1 327. 2.0	252. 6.1 327. 2.0	252. 6.1 327. 2.0	252. 6.1 327. 2.0	608. 0.5	322. 7.1	322. 7.1
352. 5.1 377. 2.0	302. 5.1 377. 2.0	302. 5.1 377. 2.0	302. 5.1 377. 2.0	658. 0.5	362. 7.1	362. 7.1
402. 5.1 427. 2.0	352. 5.1 427. 2.0	352. 5.1 427. 2.0	352. 5.1 427. 2.0	708. 0.5	402. 7.1	402. 7.1
452. 5.1 477. 2.0	402. 5.1 477. 2.0	402. 5.1 477. 2.0	402. 5.1 477. 2.0	758. 0.5	442. 7.1	442. 7.1
502. 5.1 527. 2.0	452. 5.1 527. 2.0	452. 5.1 527. 2.0	452. 5.1 527. 2.0	808. 0.5	482. 7.1	482. 7.1
552. 5.1 577. 2.0	502. 5.1 577. 2.0	502. 5.1 577. 2.0	502. 5.1 577. 2.0	858. 0.5	522. 7.1	522. 7.1
602. 5.1 627. 2.0	552. 5.1 627. 2.0	552. 5.1 627. 2.0	552. 5.1 627. 2.0	908. 0.5	562. 7.1	562. 7.1
652. 5.1 677. 2.0	602. 5.1 677. 2.0	602. 5.1 677. 2.0	602. 5.1 677. 2.0	958. 0.5	602. 7.1	602. 7.1
702. 5.1 727. 2.0	652. 5.1 727. 2.0	652. 5.1 727. 2.0	652. 5.1 727. 2.0	1008. 0.5	642. 7.1	642. 7.1
752. 5.1 777. 2.0	702. 5.1 777. 2.0	702. 5.1 777. 2.0	702. 5.1 777. 2.0	1058. 0.5	682. 7.1	682. 7.1
802. 5.1 827. 2.0	752. 5.1 827. 2.0	752. 5.1 827. 2.0	752. 5.1 827. 2.0	1108. 0.5	722. 7.1	722. 7.1
852. 5.1 877. 2.0	802. 5.1 877. 2.0	802. 5.1 877. 2.0	802. 5.1 877. 2.0	1158. 0.5	762. 7.1	762. 7.1
902. 5.1 927. 2.0	852. 5.1 927. 2.0	852. 5.1 927. 2.0	852. 5.1 927. 2.0	1208. 0.5	802. 7.1	802. 7.1
952. 5.1 977. 2.0	902. 5.1 977. 2.0	902. 5.1 977. 2.0	902. 5.1 977. 2.0	1258. 0.5	842. 7.1	842. 7.1
1002. 5.1 1027. 2.0	952. 5.1 1027. 2.0	952. 5.1 1027. 2.0	952. 5.1 1027. 2.0	1308. 0.5	882. 7.1	882. 7.1
1052. 5.1 1077. 2.0	1002. 5.1 1077. 2.0	1002. 5.1 1077. 2.0	1002. 5.1 1077. 2.0	1358. 0.5	922. 7.1	922. 7.1
1102. 5.1 1127. 2.0	1052. 5.1 1127. 2.0	1052. 5.1 1127. 2.0	1052. 5.1 1127. 2.0	1408. 0.5	962. 7.1	962. 7.1
1152. 5.1 1177. 2.0	1102. 5.1 1177. 2.0	1102. 5.1 1177. 2.0	1102. 5.1 1177. 2.0	1458. 0.5	1002. 7.1	1002. 7.1
1202. 5.1 1227. 2.0	1152. 5.1 1227. 2.0	1152. 5.1 1227. 2.0	1152. 5.1 1227. 2.0	1508. 0.5	1042. 7.1	1042. 7.1
1252. 5.1 1277. 2.0	1202. 5.1 1277. 2.0	1202. 5.1 1277. 2.0	1202. 5.1 1277. 2.0	1558. 0.5	1082. 7.1	1082. 7.1
1302. 5.1 1327. 2.0	1252. 5.1 1327. 2.0	1252. 5.1 1327. 2.0	1252. 5.1 1327. 2.0	1608. 0.5	1122. 7.1	1122. 7.1
1352. 5.1 1377. 2.0	1302. 5.1 1377. 2.0	1302. 5.1 1377. 2.0	1302. 5.1 1377. 2.0	1658. 0.5	1162. 7.1	1162. 7.1
1402. 5.1 1427. 2.0	1352. 5.1 1427. 2.0	1352. 5.1 1427. 2.0	1352. 5.1 1427. 2.0	1708. 0.5	1202. 7.1	1202. 7.1
1452. 5.1 1477. 2.0	1402. 5.1 1477. 2.0	1402. 5.1 1477. 2.0	1402. 5.1 1477. 2.0	1758. 0.5	1242. 7.1	1242. 7.1
1502. 5.1 1527. 2.0	1452. 5.1 1527. 2.0	1452. 5.1 1527. 2.0	1452. 5.1 1527. 2.0	1808. 0.5	1282. 7.1	1282. 7.1
1552. 5.1 1577. 2.0	1502. 5.1 1577. 2.0	1502. 5.1 1577. 2.0	1502. 5.1 1577. 2.0	1858. 0.5	1322. 7.1	1322. 7.1
1602. 5.1 1627. 2.0	1552. 5.1 1627. 2.0	1552. 5.1 1627. 2.0	1552. 5.1 1627. 2.0	1908. 0.5	1362. 7.1	1362. 7.1
1652. 5.1 1677. 2.0	1602. 5.1 1677. 2.0	1602. 5.1 1677. 2.0	1602. 5.1 1677. 2.0	1958. 0.5	1402. 7.1	1402. 7.1
1702. 5.1 1727. 2.0	1652. 5.1 1727. 2.0	1652. 5.1 1727. 2.0	1652. 5.1 1727. 2.0	2008. 0.5	1442. 7.1	1442. 7.1
1752. 5.1 1777. 2.0	1702. 5.1 1777. 2.0	1702. 5.1 1777. 2.0	1702. 5.1 1777. 2.0	2058. 0.5	1482. 7.1	1482. 7.1
1802. 5.1 1827. 2.0	1752. 5.1 1827. 2.0	1752. 5.1 1827. 2.0	1752. 5.1 1827. 2.0	2108. 0.5	1522. 7.1	1522. 7.1
1852. 5.1 1877. 2.0	1802. 5.1 1877. 2.0	1802. 5.1 1877. 2.0	1802. 5.1 1877. 2.0	2158. 0.5	1562. 7.1	1562. 7.1
1902. 5.1 1927. 2.0	1852. 5.1 1927. 2.0	1852. 5.1 1927. 2.0	1852. 5.1 1927. 2.0	2208. 0.5	1602. 7.1	1602. 7.1
1952. 5.1 1977. 2.0	1902. 5.1 1977. 2.0	1902. 5.1 1977. 2.0	1902. 5.1 1977. 2.0	2258. 0.5	1642. 7.1	1642. 7.1
2002. 5.1 2027. 2.0	1952. 5.1 2027. 2.0	1952. 5.1 2027. 2.0	1952. 5.1 2027. 2.0	2308. 0.5	1682. 7.1	1682. 7.1
2052. 5.1 2077. 2.0	2002. 5.1 2077. 2.0	2002. 5.1 2077. 2.0	2002. 5.1 2077. 2.0	2358. 0.5	1722. 7.1	1722. 7.1
2102. 5.1 2127. 2.0	2052. 5.1 2127. 2.0	2052. 5.1 2127. 2.0	2052. 5.1 2127. 2.0	2408. 0.5	1762. 7.1	1762. 7.1
2152. 5.1 2177. 2.0	2102. 5.1 2177. 2.0	2102. 5.1 2177. 2.0	2102. 5.1 2177. 2.0	2458. 0.5	1802. 7.1	1802. 7.1
2202. 5.1 2227. 2.0	2152. 5.1 2227. 2.0	2152. 5.1 2227. 2.0	2152. 5.1 2227. 2.0	2508. 0.5	1842. 7.1	1842. 7.1
2252. 5.1 2277. 2.0	2202. 5.1 2277. 2.0	2202. 5.1 2277. 2.0	2202. 5.1 2277. 2.0	2558. 0.5	1882. 7.1	1882. 7.1
2302. 5.1 2327. 2.0	2252. 5.1 2327. 2.0	2252. 5.1 2327. 2.0	2252. 5.1 2327. 2.0	2608. 0.5	1922. 7.1	1922. 7.1
2352. 5.1 2377. 2.0	2302. 5.1 2377. 2.0	2302. 5.1 2377. 2.0	2302. 5.1 2377. 2.0	2658. 0.5	1962. 7.1	1962. 7.1
2402. 5.1 2427. 2.0	2352. 5.1 2427. 2.0	2352. 5.1 2427. 2.0	2352. 5.1 2427. 2.0	2708. 0.5	2002. 7.1	2002. 7.1
2452. 5.1 2477. 2.0	2402. 5.1 2477. 2.0	2402. 5.1 2477. 2.0	2402. 5.1 2477. 2.0	2758. 0.5	2042. 7.1	2042. 7.1
2502. 5.1 2527. 2.0	2452. 5.1 2527. 2.0	2452. 5.1 2527. 2.0	2452. 5.1 2527. 2.0	2808. 0.5	2082. 7.1	2082. 7.1
2552. 5.1 2577. 2.0	2502. 5.1 2577. 2.0	2502. 5.1 2577. 2.0	2502. 5.1 2577. 2.0	2858. 0.5	2122. 7.1	2122. 7.1
2602. 5.1 2627. 2.0	2552. 5.1 2627. 2.0	2552. 5.1 2627. 2.0	2552. 5.1 2627. 2.0	2908. 0.5	2162. 7.1	2162. 7.1
2652. 5.1 2677. 2.0	2602. 5.1 2677. 2.0	2602. 5.1 2677. 2.0	2602. 5.1 2677. 2.0	2958. 0.5	2202. 7.1	2202. 7.1
2702. 5.1 2727. 2.0	2652. 5.1 2727. 2.0	2652. 5.1 2727. 2.0	2652. 5.1 2727. 2.0	3008. 0.5	2242. 7.1	2242. 7.1
2752. 5.1 2777. 2.0	2702. 5.1 2777. 2.0	2702. 5.1 2777. 2.0	2702. 5.1 2777. 2.0	3058. 0.5	2282. 7.1	2282. 7.1
2802. 5.1 2827. 2.0	2752. 5.1 2827. 2.0	2752. 5.1 2827. 2.0	2752. 5.1 2827. 2.0	3108. 0.5	2322. 7.1	2322. 7.1
2852. 5.1 2877. 2.0	2802. 5.1 2877. 2.0	2802. 5.1 2877. 2.0	2802. 5.1 2877. 2.0	3158. 0.5	2362. 7.1	2362. 7.1
2902. 5.1 2927. 2.0	2852. 5.1 2927. 2.0	2852. 5.1 2927. 2.0	2852. 5.1 2927. 2.0	3208. 0.5	2402. 7.1	2402. 7.1
2952. 5.1 2977. 2.0	2902. 5.1 2977. 2.0	2902. 5.1 2977. 2.0	2902. 5.1 2977. 2.0	3258. 0.5	2442. 7.1	2442. 7.1
3002. 5.1 3027. 2.0	2952. 5.1 3027. 2.0	2952. 5.1 3027. 2.0	2952. 5.1 3027. 2.0	3308. 0.5	2482. 7.1	2482. 7.1
3052. 5.1 3077. 2.0	3002. 5.1 3077. 2.0	3002. 5.1 3077. 2.0	3002. 5.1 3077. 2.0	3358. 0.5	2522. 7.1	2522. 7.1
3102. 5.1 3127. 2.0	3052. 5.1 3127. 2.0	3052. 5.1 3127. 2.0	3052. 5.1 3127. 2.0	3408. 0.5	2562. 7.1	2562. 7.1
3152. 5.1 3177. 2.0	3102. 5.1 3177. 2.0	3102. 5.1 3177. 2.0	3102. 5.1 3177. 2.0	3458. 0.5	2602. 7.1	2602. 7.1
3202. 5.1 3227. 2.0	3152. 5.1 3227. 2.0	3152. 5.1 3227. 2.0	3152. 5.1 3227. 2.0	3508. 0.5	2642. 7.1	2642. 7.1
3252. 5.1 3277. 2.0	3202. 5.1 3277. 2.0	3202. 5.1 3277. 2.0	3202. 5.1 3277. 2.0	3558. 0.5	2682. 7.1	2682. 7.1
3302. 5.1 3327. 2.0	3252. 5.1 3327. 2.0	3252. 5.1 3327. 2.0	3252. 5.1 3327. 2.0	3608. 0.5	2722. 7.1	2722. 7.1
3352. 5.1 3377. 2.0	3302. 5.1 3377. 2.0	3302. 5.1 3377. 2.0	3302. 5.1 3377. 2.0	3658. 0.5	2762. 7.1	2762. 7.1
3402. 5.1 3427. 2.0	3352. 5.1 3427. 2.0	3352. 5.1 3427. 2.0	3352. 5.1 3427. 2.0	3708. 0.5	2802. 7.1	2802. 7.1
3452. 5.1 3477. 2.0	3402. 5.1 3477. 2.0	3402. 5.1 3477. 2.0	3402. 5.1 3477. 2.0	3758. 0.5	2842. 7.1	2842. 7.1
3502. 5.1 3527. 2.0	3452. 5.1 3527. 2.0	3452. 5.1 3527. 2.0	3452. 5.1 3527. 2.0	3808. 0.5	2882. 7.1	2882. 7.1
3552. 5.1 3577. 2.0	3502. 5.1 3577. 2.0	3502. 5.1 3577. 2.0	3502. 5.1 3577. 2.0	3858. 0.5	2922. 7.1	2922. 7.1
3602. 5.1 3627. 2.0	3552. 5.1 3627. 2.0	3552. 5.1 3627. 2.0	3552. 5.1 3627. 2.0	3908. 0.5	2962. 7.1	2962. 7.1
3652. 5.1 3677. 2.0	3602. 5.1 3677. 2.0	3602. 5.1 3677. 2.0	3602. 5.1 3677. 2.0	3958. 0.5	3002. 7.1	3002. 7.1
3702. 5.1 3727. 2.0	3652. 5.1 3727. 2.0	3652. 5.1 3727. 2.0	3652. 5.1 3727. 2.0	4008. 0.5	3042. 7.1	3042. 7.1
3752. 5.1 3777. 2.0	3702. 5.1 3777. 2.0	3702. 5.1 3777. 2.0	3702. 5.1 3777. 2.0	4058. 0.5	3082. 7.1	3082. 7.1
3802. 5.1 3827. 2.0	3752. 5.1 3827. 2.0	3752. 5.1 3827. 2.0	3752. 5.1 3827. 2.0	4108. 0.5	3122. 7.1	3122. 7.1
3852. 5.1 3877. 2.0	3802. 5.1 3877. 2.0	3802. 5.1 3877. 2.0	3802. 5.1 3877. 2.0	4158. 0.5	3162. 7.1	3162. 7.1
3902. 5.1 3927. 2.0	3852. 5.1 3927. 2.0	3852. 5.1 3927. 2.0	3852. 5.1 3927. 2.0	4208.		

DATE 651039	DATE 651224	DATE 660124	DATE 660329	DATE 660426	DATE 661103	DATE 670118	DATE 670503
SRVY 50	SRVY 51	SRVY 50	SRVY 51	SRVY 50	SRVY 47	SRVY 46	SRVY 46
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
0. 12.2	0. 12.9	40. 10.7	0. 12.5	0. 12.5	0. 12.6	0. 12.5	0. 12.5
51. 10.3	50. 10.6	100. 9.7	49. 10.6	49. 10.4	49. 10.7	50. 10.5	50. 10.3
100.4 9.4	9.5 10.0	150. 8.9	100. 9.5	100. 9.5	100. 9.7	100. 9.4	101. 9.2
154. 8.7	151. 8.3	200. 8.3	151. 8.6	150. 8.6	151. 8.6	151. 8.7	151. 8.7
204. 7.7	202. 7.8	251. 7.6	201. 8.0	201. 8.0	201. 8.1	201. 8.0	201. 8.0
252. 6.9	252. 7.0	301. 6.7	251. 7.5	251. 7.4	251. 7.4	251. 7.4	252. 7.4
302. 6.4	302. 6.4	351. 5.6	301. 7.1	301. 7.3	302. 7.3	302. 7.4	291. 6.1
352. 5.5	352. 5.6	402. 4.7	351. 5.4	351. 5.9	352. 7.3	352. 8.2	326. 2.9
377. 4.6	373. 5.6	452. 3.7	402. 5.3	402. 5.3	402. 2.9	403. 5.2	402. 2.9
403. 3.2	402. 3.0	503. 2.8	452. 4.2	452. 4.2	452. 4.2	453. 3.8	453. 3.8
426. 2.4	424. 3.3	553. 1.9	503. 4.6	503. 4.6	503. 4.6	503. 3.8	453. 3.8
476. 1.9	471. 2.0	603. 1.9	553. 4.6	553. 4.6	503. 4.6	553. 1.1	503. 4.6
496. 1.6	491. 1.1				503. 4.6		503. 4.6
506. 0.9	500. 1.1				503. 4.6		503. 4.6
536. 0.5	531. 0.5				503. 4.6		503. 4.6
566. 0.1	561. 0.1				503. 4.6		503. 4.6
596. 0.1	591. 0.1				503. 4.6		503. 4.6
626. 0.1	621. 0.1				503. 4.6		503. 4.6
656. 0.1	651. 0.1				503. 4.6		503. 4.6
686. 0.1	681. 0.1				503. 4.6		503. 4.6
716. 0.1	711. 0.1				503. 4.6		503. 4.6
746. 0.1	741. 0.1				503. 4.6		503. 4.6
776. 0.1	771. 0.1				503. 4.6		503. 4.6
806. 0.1	801. 0.1				503. 4.6		503. 4.6
836. 0.1	831. 0.1				503. 4.6		503. 4.6
866. 0.1	861. 0.1				503. 4.6		503. 4.6
896. 0.1	891. 0.1				503. 4.6		503. 4.6
926. 0.1	921. 0.1				503. 4.6		503. 4.6
956. 0.1	951. 0.1				503. 4.6		503. 4.6
986. 0.1	981. 0.1				503. 4.6		503. 4.6
1016. 0.1	1011. 0.1				503. 4.6		503. 4.6
1046. 0.1	1041. 0.1				503. 4.6		503. 4.6
1076. 0.1	1071. 0.1				503. 4.6		503. 4.6
1106. 0.1	1101. 0.1				503. 4.6		503. 4.6
1136. 0.1	1131. 0.1				503. 4.6		503. 4.6
1166. 0.1	1161. 0.1				503. 4.6		503. 4.6
1196. 0.1	1191. 0.1				503. 4.6		503. 4.6
1226. 0.1	1221. 0.1				503. 4.6		503. 4.6
1256. 0.1	1251. 0.1				503. 4.6		503. 4.6
1286. 0.1	1281. 0.1				503. 4.6		503. 4.6
1316. 0.1	1311. 0.1				503. 4.6		503. 4.6
1346. 0.1	1341. 0.1				503. 4.6		503. 4.6
1376. 0.1	1371. 0.1				503. 4.6		503. 4.6
1406. 0.1	1401. 0.1				503. 4.6		503. 4.6
1436. 0.1	1431. 0.1				503. 4.6		503. 4.6
1466. 0.1	1461. 0.1				503. 4.6		503. 4.6
1496. 0.1	1491. 0.1				503. 4.6		503. 4.6
1526. 0.1	1521. 0.1				503. 4.6		503. 4.6
1556. 0.1	1551. 0.1				503. 4.6		503. 4.6
1586. 0.1	1581. 0.1				503. 4.6		503. 4.6
1616. 0.1	1611. 0.1				503. 4.6		503. 4.6
1646. 0.1	1641. 0.1				503. 4.6		503. 4.6
1676. 0.1	1671. 0.1				503. 4.6		503. 4.6
1706. 0.1	1701. 0.1				503. 4.6		503. 4.6
1736. 0.1	1731. 0.1				503. 4.6		503. 4.6
1766. 0.1	1761. 0.1				503. 4.6		503. 4.6
1796. 0.1	1791. 0.1				503. 4.6		503. 4.6
1826. 0.1	1821. 0.1				503. 4.6		503. 4.6
1856. 0.1	1851. 0.1				503. 4.6		503. 4.6
1886. 0.1	1881. 0.1				503. 4.6		503. 4.6
1916. 0.1	1911. 0.1				503. 4.6		503. 4.6
1946. 0.1	1941. 0.1				503. 4.6		503. 4.6
1976. 0.1	1971. 0.1				503. 4.6		503. 4.6
2006. 0.1	2001. 0.1				503. 4.6		503. 4.6
2036. 0.1	2031. 0.1				503. 4.6		503. 4.6
2066. 0.1	2061. 0.1				503. 4.6		503. 4.6
2096. 0.1	2091. 0.1				503. 4.6		503. 4.6
2126. 0.1	2121. 0.1				503. 4.6		503. 4.6
2156. 0.1	2151. 0.1				503. 4.6		503. 4.6
2186. 0.1	2181. 0.1				503. 4.6		503. 4.6
2216. 0.1	2211. 0.1				503. 4.6		503. 4.6
2246. 0.1	2241. 0.1				503. 4.6		503. 4.6
2276. 0.1	2271. 0.1				503. 4.6		503. 4.6
2306. 0.1	2301. 0.1				503. 4.6		503. 4.6
2336. 0.1	2331. 0.1				503. 4.6		503. 4.6
2366. 0.1	2361. 0.1				503. 4.6		503. 4.6
2396. 0.1	2391. 0.1				503. 4.6		503. 4.6
2426. 0.1	2421. 0.1				503. 4.6		503. 4.6
2456. 0.1	2451. 0.1				503. 4.6		503. 4.6
2486. 0.1	2481. 0.1				503. 4.6		503. 4.6
2516. 0.1	2511. 0.1				503. 4.6		503. 4.6
2546. 0.1	2541. 0.1				503. 4.6		503. 4.6
2576. 0.1	2571. 0.1				503. 4.6		503. 4.6
2606. 0.1	2601. 0.1				503. 4.6		503. 4.6
2636. 0.1	2631. 0.1				503. 4.6		503. 4.6
2666. 0.1	2661. 0.1				503. 4.6		503. 4.6
2696. 0.1	2691. 0.1				503. 4.6		503. 4.6
2726. 0.1	2721. 0.1				503. 4.6		503. 4.6
2756. 0.1	2751. 0.1				503. 4.6		503. 4.6
2786. 0.1	2781. 0.1				503. 4.6		503. 4.6
2816. 0.1	2811. 0.1				503. 4.6		503. 4.6
2846. 0.1	2841. 0.1				503. 4.6		503. 4.6
2876. 0.1	2871. 0.1				503. 4.6		503. 4.6
2906. 0.1	2901. 0.1				503. 4.6		503. 4.6
2936. 0.1	2931. 0.1				503. 4.6		503. 4.6
2966. 0.1	2961. 0.1				503. 4.6		503. 4.6
2996. 0.1	2991. 0.1				503. 4.6		503. 4.6
3026. 0.1	3021. 0.1				503. 4.6		503. 4.6
3056. 0.1	3051. 0.1				503. 4.6		503. 4.6
3086. 0.1	3081. 0.1				503. 4.6		503. 4.6
3116. 0.1	3111. 0.1				503. 4.6		503. 4.6
3146. 0.1	3141. 0.1				503. 4.6		503. 4.6
3176. 0.1	3171. 0.1				503. 4.6		503. 4.6
3206. 0.1	3201. 0.1				503. 4.6		503. 4.6
3236. 0.1	3231. 0.1				503. 4.6		503. 4.6
3266. 0.1	3261. 0.1				503. 4.6		503. 4.6
3296. 0.1	3291. 0.1				503. 4.6		503. 4.6
3326. 0.1	3321. 0.1				503. 4.6		503. 4.6
3356. 0.1	3351. 0.1				503. 4.6		503. 4.6
3386. 0.1	3381. 0.1				503. 4.6		503. 4.6
3416. 0.1	3411. 0.1				503. 4.6		503. 4.6
3446. 0.1	3441. 0.1				503. 4.6		503. 4.6
3476. 0.1	3471. 0.1				503. 4.6		503. 4.6
3506. 0.1	3501. 0.1				503. 4.6		503. 4.6
3536. 0.1	3531. 0.1				503. 4.6		503. 4.6
3566. 0.1	3561. 0.1				503. 4.6		503. 4.6
3596. 0.1	3591. 0.1				503. 4.6		503. 4.6
3626. 0.1	3621. 0.1				503. 4.6		503. 4.6
3656. 0.1	3651. 0.1				503. 4.6		503. 4.6
3686. 0.1	3681. 0.1				503. 4.6		503. 4.6
3716. 0.1	3711. 0.1				503. 4.6		503. 4.6
3746. 0.1	3741. 0.1				503. 4.6		503. 4.6
3776. 0.1	3771. 0.1				503. 4.6		503. 4.6
3806. 0.1	3801. 0.1				503. 4.6		503. 4.6
3836. 0.1	3831. 0.1				503. 4.6		503. 4.6
3866. 0.1	3861. 0.1				503. 4.6		503. 4.6
3896. 0.1	3891. 0.1				503. 4.6		503. 4.6
3926. 0.1	3921. 0.1				503. 4.6		503. 4.6
3956. 0.1	3951. 0.1				503. 4.6		503. 4.6
3986. 0.1	3981. 0.1				503. 4.6		503. 4.6
4016. 0.1	4011. 0.1				503. 4.6		503. 4.6
4046. 0.1	4041. 0.1				503. 4.6		503. 4.6
4076. 0.1	4071. 0.1				503. 4.6		503. 4.6
4106. 0.1	4101. 0.1				503. 4.6		503. 4.6
4136. 0.1	4131. 0.1				503. 4.6		503. 4.6
4166. 0.1	4161. 0.1				503. 4.6		503. 4.6
4196. 0.1	4191. 0.1				503. 4.6		503. 4.6
4226. 0.1</							

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DATE 720110	DATE 720214	DATE 720222	DATE 720317	DATE 720410	DATE 720421	DATE 721040	DATE 721206
SRVY 106	SRVY 107	SRVY 108	SRVY 109	SRVY 110	SRVY 111	SRVY 112	SRVY 113
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1400	TIME 1200	TIME 1400
-----	-----	-----	-----	-----	-----	-----	-----
0. 12.3	0. 12.2	0. 12.4	0. 12.3	0. 12.4	0. 12.0	0. 12.4	0. 12.4
50. 11.4	50. 10.3	50. 11.0	50. 11.4	50. 11.0	50. 11.0	50. 11.3	50. 11.0
100. 9.0	100. 9.0	100. 9.0	100. 9.1	100. 9.1	100. 9.1	100. 9.2	100. 9.1
150. 7.5	150. 8.0	150. 8.0	150. 8.0	150. 8.0	150. 8.0	150. 8.0	150. 8.0
200. 6.5	200. 6.5	200. 6.5	200. 6.5	200. 6.5	200. 6.5	200. 6.5	200. 6.5
250. 5.4	250. 5.4	250. 5.4	250. 5.4	250. 5.4	250. 5.4	250. 5.4	250. 5.4
300. 4.4	300. 4.4	300. 4.4	300. 4.4	300. 4.4	300. 4.4	300. 4.4	300. 4.4
325. 3.8	325. 3.8	325. 3.8	325. 3.8	325. 3.8	325. 3.8	325. 3.8	325. 3.8
350. 3.3	350. 3.3	350. 3.3	350. 3.3	350. 3.3	350. 3.3	350. 3.3	350. 3.3
400. 2.7	400. 2.7	400. 2.7	400. 2.7	400. 2.7	400. 2.7	400. 2.7	400. 2.7
450. 1.8	450. 1.8	450. 1.8	450. 1.8	450. 1.8	450. 1.8	450. 1.8	450. 1.8
500. 1.2	500. 1.2	500. 1.2	500. 1.2	500. 1.2	500. 1.2	500. 1.2	500. 1.2
550. .8	550. .8	550. .8	550. .8	550. .8	550. .8	550. .8	550. .8
600. .5	600. .5	600. .5	600. .5	600. .5	600. .5	600. .5	600. .5
650. .3	650. .3	650. .3	650. .3	650. .3	650. .3	650. .3	650. .3
700. .2	700. .2	700. .2	700. .2	700. .2	700. .2	700. .2	700. .2
750. .1	750. .1	750. .1	750. .1	750. .1	750. .1	750. .1	750. .1

DATE 730103	DATE 730216	DATE 730316	DATE 730325	DATE 730405	DATE 730418	DATE 730501
SRVY 114	SRVY 115	SRVY 116	SRVY 117	SRVY 118	SRVY 119	SRVY 120
TIME 1100	TIME 1000	TIME 900	TIME 700	TIME 1300	TIME 1200	TIME 1100
-----	-----	-----	-----	-----	-----	-----
0. 12.3	0. 12.3	0. 12.4	0. 12.4	0. 12.4	0. 12.4	0. 12.4
50. 10.9	50. 10.9	50. 10.8	50. 10.7	50. 10.7	50. 10.7	50. 10.7
100. 9.9	100. 10.0	100. 9.9	100. 9.9	100. 9.9	100. 9.9	100. 9.9
150. 9.0	150. 9.1	150. 9.1	150. 9.1	150. 9.1	150. 9.1	150. 9.1
200. 8.1	200. 8.1	200. 8.1	200. 8.1	200. 8.1	200. 8.1	200. 8.1
250. 7.4	250. 7.4	250. 7.4	250. 7.4	250. 7.4	250. 7.4	250. 7.4
300. 6.7	300. 6.7	300. 6.7	300. 6.7	300. 6.7	300. 6.7	300. 6.7
350. 6.0	350. 6.0	350. 6.0	350. 6.0	350. 6.0	350. 6.0	350. 6.0
400. 5.3	400. 5.3	400. 5.3	400. 5.3	400. 5.3	400. 5.3	400. 5.3
450. 4.6	450. 4.6	450. 4.6	450. 4.6	450. 4.6	450. 4.6	450. 4.6
500. 3.9	500. 3.9	500. 3.9	500. 3.9	500. 3.9	500. 3.9	500. 3.9
550. 3.2	550. 3.2	550. 3.2	550. 3.2	550. 3.2	550. 3.2	550. 3.2
600. 2.5	600. 2.5	600. 2.5	600. 2.5	600. 2.5	600. 2.5	600. 2.5
650. 1.8	650. 1.8	650. 1.8	650. 1.8	650. 1.8	650. 1.8	650. 1.8
700. 1.1	700. 1.1	700. 1.1	700. 1.1	700. 1.1	700. 1.1	700. 1.1
750. .4	750. .4	750. .4	750. .4	750. .4	750. .4	750. .4

DATE 621024	DATE 621101	DATE 621109	DATE 621212	DATE 630109	DATE 630116	DATE 630122	DATE 630130
SRVY 1	SRVY 2	SRVY 3	SRVY 4	SRVY 5	SRVY 6	SRVY 7	SRVY 8
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
30. 7.2	3. 7.4	27. 7.8	-22. 7.0	7.5 0.	26. 7.6	100. 6.6	1. 7.4
63. 7.2	25. 7.7	84. 7.1	24. 6.0	27. 7.5	101. 6.5	126. 6.0	27. 7.3
120. 7.6	65. 7.3	146. 6.1	36. 7.8	75. 7.1	127. 6.5	152. 6.0	57. 7.0
180. 5.6	106. 6.8	144. 6.0	88. 6.0	100. 6.7	150. 6.8	178. 6.4	74. 6.0
236. 5.8	155. 7.0	214. 5.5	184. 7.2	150. 5.0	201. 6.7	241. 5.8	99. 6.5
300. 5.8	216. 7.3	274. 6.0	246. 7.0	202. 6.6	276. 3.2	314. 3.2	124. 6.0
364. 6.7	281. 8.0	344. 6.0	301. 6.7	247. 6.6	301. 2.6	326. 1.9	149. 5.9
427. 6.7	341. 8.5	404. 6.5	368. 7.9	300. 6.4	351. 1.1	381. 1.1	175. 6.4
492. 7.4	407. 8.7	473. 6.0	438. 8.0	340. 3.3	393. 1.7	426. -1.3	200. 6.5
556. -2.1	466. 9.0		508. -7.7	400. 3.4	427. 1.7	456. -1.6	225. 5.8
			532. -2.3	434. 3.1	456. 1.6		250. 4.7
			532. -2.3	434. 3.1	456. 1.6		301. 3.3
				476. -1.5	476. -1.5		325. 2.4
							350. 2.0
							400. 1.8
							456. -1.3
							501. -1.0

DATE 630215	DATE 630213	DATE 630221	DATE 630227	DATE 630307	DATE 630313	DATE 630321	DATE 630402
SRVY 9	SRVY 10	SRVY 11	SRVY 12	SRVY 13	SRVY 14	SRVY 15	SRVY 16
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
149. 6.0	250. 4.7	-1. 7.6	300. 3.8	150. 6.0	7.6 7.6	300. 6.9	191. 6.7
175. 6.7	275. 4.4	40. 7.4	325. 3.2	175. 6.6	7.5 7.5	327. 5.1	225. 5.8
200. 6.5	300. 3.6	74. 7.1	350. 4.5	200. 6.0	7.2 7.2	354. 3.3	250. 4.8
226. 6.5	325. 3.5	140. 6.0	375. 4.2	225. 5.7	7.0 7.0	381. 3.6	275. 4.7
270. 4.2	370. 1.9	174. 6.0	400. 1.6	250. 4.7	6.9 6.9	400. 1.9	300. 5.4
301. 3.4	400. 0.0	176. 6.6	425. 0.0	275. 4.3	6.0 6.0	425. 1.2	326. 5.5
350. 1.8	450. -1.6	200. 6.4	450. -1.1	291. 4.4	6.0 6.0	451. -2.2	350. 3.6
401. 1.0	475. -1.6	241. 5.0	475. -1.1	300. 4.9	6.7 6.7	475. -1.1	375. 2.2
426. 1.7		276. 6.3	325. 5.0	325. 5.0	5.0 5.0	501. -1.0	401. 1.3
475. -1.6		350. 3.0	351. 3.2	375. 1.7	5.0 5.0		426. 0.8
		401. 2.0	400. 0.8	431. 0.0	5.1 5.1		475. -0.7
		445. 0.2	475. -1.1	475. -1.1	375. 2.0		501. 0.7
					400. 0.0		
					426. -1.1		
					451. -0.9		
					475. -0.9		

DATE 630523	DATE 630607	DATE 630712	DATE 630826	DATE 630811	DATE 630923
SRVY 17	SRVY 20	SRVY 20	SRVY 16	SRVY 1A	SRVY 17
TIME 1800	TIME 1800	TIME 1800	TIME 1800	TIME 1800	TIME 1800
25. 8.0	-1. 6.6	-1. 6.6	6.9	0. 6.6	25. 8.0
51. 9.4	24. 7.8	24. 7.8	7.7	25. 7.7	74. 7.3
74. 6.5	50. 7.4	50. 7.4	8.1	51. 7.4	99. 6.5
99. 6.5	7.6	100. 6.5	7.6	7.6	124. 6.0
124. 6.0	124. 6.0	124. 6.0	125. 6.0	124. 6.0	151. 6.0
151. 6.0	151. 6.0	151. 6.0	151. 6.0	151. 6.0	174. 6.2
174. 6.2	174. 6.2	174. 6.2	200. 6.3	174. 6.2	200. 6.2
200. 6.2	200. 6.2	200. 6.2	228. 5.7	200. 6.3	228. 5.6
228. 5.6	228. 5.6	228. 5.6	251. 5.0	228. 5.7	251. 4.9
251. 4.9	251. 4.9	251. 4.9	325. 5.8	251. 5.0	271. 4.7
271. 4.7	271. 4.7	271. 4.7	351. 6.0	271. 4.7	325. 5.0
325. 5.0	325. 5.0	325. 5.0	401. 1.7	325. 5.0	245. 5.0
245. 5.0	245. 5.0	245. 5.0	401. 1.2	350. 3.8	323. 5.6
323. 5.6	323. 5.6	323. 5.6	426. 1.8	377. 2.1	350. 5.2
350. 5.2	350. 5.2	350. 5.2	461. 0.0	401. 1.2	375. 3.2
375. 3.2	375. 3.2	375. 3.2	561. 0.7	426. 1.8	408. 1.4
408. 1.4	408. 1.4	408. 1.4		452. 1.4	461. 1.4
461. 1.4	461. 1.4	461. 1.4		501. 0.1	471. 0.1
471. 0.1	471. 0.1	471. 0.1			501. 0.1
501. 0.1	501. 0.1	501. 0.1			520. 0.9
520. 0.9	520. 0.9	520. 0.9			520. 0.9

DATE 630923	DATE 630923	DATE 630923	DATE 630923	DATE 630923	DATE 630923
SRVY 25	SRVY 33	SRVY 32	SRVY 31	SRVY 30	SRVY 28
TIME 1200	TIME 1200	TIME 1800	TIME 1800	TIME 1800	TIME 1800
124. 6.0	0. 7.6	0. 7.6	0. 7.6	0. 7.6	-23. 8.7
151. 6.2	50. 5.0	50. 5.0	50. 5.0	50. 5.0	27. 8.1
174. 6.2	101. 6.5	101. 6.5	101. 6.5	101. 6.5	50. 8.1
202. 5.4	151. 6.6	151. 6.6	151. 6.6	151. 6.6	100. 6.5
244. 4.7	202. 6.7	202. 6.7	202. 6.7	202. 6.7	126. 5.9
277. 4.4	252. 5.2	252. 5.2	252. 5.2	252. 5.2	151. 6.2
320. 1.7	304. 3.9	304. 3.9	304. 3.9	304. 3.9	176. 6.2
350. 3.7	353. 2.2	353. 2.2	353. 2.2	353. 2.2	201. 6.5
377. 0.6	403. 0.7	403. 0.7	403. 0.7	403. 0.7	227. 6.4
403. 0.8	484. 0.3	484. 0.3	484. 0.3	484. 0.3	251. 6.2
430. 0.4	504. 0.4	504. 0.4	504. 0.4	504. 0.4	302. 6.4
453. 0.4	555. 0.2	555. 0.2	555. 0.2	555. 0.2	327. 1.3
	580. 0.0	580. 0.0	580. 0.0	580. 0.0	377. 0.4
					403. 0.9
					433. 0.1
					454. 0.2
					479. 0.6
					503. 0.9
					520. 1.0
					539. 0.6

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DATE	SRVY	TIME	DATE	SRVY	TIME	DATE	SRVY	TIME	DATE	SRVY	TIME	DATE	SRVY	TIME	DATE	SRVY	TIME
670915	50	1200	670919	51	1200	671213	52	1200	680115	53	1200	680124	54	1200	680130	55	1200
0.	6.7	0.	0.	6.4	0.	0.	8.6	0.	-1.	9.5	0.	0.	9.6	0.	9.5	0.	9.4
50.	9.4	50.	50.	9.4	50.	9.3	4.	9.3	4.	9.5	50.	50.	9.9	50.	50.	50.	9.4
100.	8.4	100.	100.	8.3	100.	8.1	9.	9.2	9.	9.2	100.	100.	9.0	100.	9.0	100.	9.8
150.	7.2	150.	150.	6.9	150.	7.2	7.1	1.8	1.8	4.2	150.	150.	8.2	150.	8.2	150.	8.9
200.	7.4	200.	200.	7.3	200.	7.2	7.2	2.0	2.0	8.0	200.	200.	8.0	200.	8.2	200.	7.9
250.	5.7	250.	250.	8.4	250.	9.6	9.6	5.0	5.0	8.9	250.	250.	8.0	250.	6.8	250.	7.9
300.	2.4	300.	300.	8.4	300.	2.8	2.8	3.0	3.0	9.9	300.	300.	2.9	300.	6.8	300.	7.9
350.	2.4	350.	350.	8.4	350.	2.8	2.8	3.0	3.0	9.9	350.	350.	2.9	350.	6.8	350.	7.9
400.	2.8	400.	400.	1.2	400.	1.2	1.2	3.0	3.0	9.9	400.	400.	2.7	400.	2.7	400.	2.2
450.	2.7	450.	450.	1.2	450.	1.2	1.2	3.0	3.0	9.9	450.	450.	2.7	450.	2.7	450.	2.2
501.	0.0	501.	501.	1.4	501.	1.4	1.4	3.0	3.0	9.9	501.	501.	2.7	501.	2.7	501.	2.2
551.	0.0	551.	551.	1.4	551.	1.4	1.4	3.0	3.0	9.9	551.	551.	2.7	551.	2.7	551.	2.2
650.	-1.6	650.	650.	1.4	650.	1.4	1.4	3.0	3.0	9.9	650.	650.	2.7	650.	2.7	650.	2.2
701.	-2.3	701.	701.	1.4	701.	1.4	1.4	3.0	3.0	9.9	701.	701.	2.7	701.	2.7	701.	2.2

DATE	SRVY	TIME	DATE	SRVY	TIME	DATE	SRVY	TIME	DATE	SRVY	TIME	DATE	SRVY	TIME	DATE	SRVY	TIME
680223	56	1200	680226	57	1200	680307	58	1200	680313	59	1200	680322	60	1200	681007	65	1200
0.	9.1	0.	0.	9.1	0.	0.	9.5	0.	200.	7.9	0.	0.	10.0	0.	5.7	0.	1.8
50.	9.6	50.	50.	9.6	50.	9.7	350.	7.7	350.	4.9	50.	10.3	50.	9.0	9.0	50.	8.3
100.	8.4	100.	100.	8.3	100.	8.9	300.	4.9	300.	4.9	102.	8.6	100.	8.6	9.0	100.	8.3
150.	7.8	150.	150.	7.7	150.	7.8	351.	2.7	351.	2.7	150.	7.8	150.	7.7	9.0	100.	8.3
201.	7.9	200.	200.	7.9	200.	7.9	401.	0.7	401.	0.7	200.	7.9	200.	7.4	150.	200.	7.6
250.	7.7	250.	250.	7.7	250.	7.7	430.	0.0	430.	0.0	250.	7.8	250.	7.1	200.	250.	7.6
300.	6.2	300.	300.	6.0	300.	6.0	500.	-0.4	500.	-0.4	250.	7.8	250.	5.8	300.	300.	7.6
350.	4.5	350.	350.	3.8	350.	3.8	523.	-2.9	523.	-2.9	250.	7.8	250.	5.8	300.	300.	7.6
400.	2.1	400.	400.	1.9	400.	1.9	500.	0.0	500.	0.0	300.	3.9	300.	3.6	300.	350.	2.6
450.	0.8	450.	450.	0.8	450.	0.8	500.	0.0	500.	0.0	400.	1.7	400.	1.6	320.	400.	2.6
500.	-0.6	500.	500.	-0.6	500.	-0.6	500.	0.0	500.	0.0	400.	1.7	400.	1.6	320.	400.	2.6
550.	-2.3	550.	550.	-2.3	550.	-2.3	523.	-1.1	523.	-1.1	400.	1.7	400.	1.6	320.	400.	2.6
600.	-2.3	600.	600.	-2.3	600.	-2.3	523.	-1.1	523.	-1.1	400.	1.7	400.	1.6	320.	400.	2.6
650.	-2.3	650.	650.	-2.3	650.	-2.3	523.	-1.1	523.	-1.1	400.	1.7	400.	1.6	320.	400.	2.6
700.	-2.3	700.	700.	-2.3	700.	-2.3	523.	-1.1	523.	-1.1	400.	1.7	400.	1.6	320.	400.	2.6

DATE 001220	DATE 000113	DATE 000122	DATE 000129	DATE 000205	DATE 000212	DATE 000219	DATE 000226
SRVY 86	SRVY 87	SRVY 88	SRVY 89	SRVY 70	SRVY 71	SRVY 72	SRVY 73
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
00	00	00	00	00	00	00	00
50	50	50	50	50	50	50	50
60	60	60	60	60	60	60	60
70	70	70	70	70	70	70	70
80	80	80	80	80	80	80	80
90	90	90	90	90	90	90	90
100	100	100	100	100	100	100	100
150	150	150	150	150	150	150	150
200	200	200	200	200	200	200	200
250	250	250	250	250	250	250	250
300	300	300	300	300	300	300	300
350	350	350	350	350	350	350	350
400	400	400	400	400	400	400	400
450	450	450	450	450	450	450	450
500	500	500	500	500	500	500	500
550	550	550	550	550	550	550	550
600	600	600	600	600	600	600	600
650	650	650	650	650	650	650	650
675	675	675	675	675	675	675	675

DATE 000135	DATE 000112	DATE 000119	DATE 000127	DATE 000093	DATE 000103	DATE 000120	DATE 000116
SRVY 80	SRVY 71	SRVY 72	SRVY 73	SRVY 74	SRVY 75	SRVY 80	SRVY 81
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1200
00	00	00	00	00	00	00	00
50	50	50	50	50	50	50	50
60	60	60	60	60	60	60	60
70	70	70	70	70	70	70	70
80	80	80	80	80	80	80	80
90	90	90	90	90	90	90	90
100	100	100	100	100	100	100	100
150	150	150	150	150	150	150	150
180	180	180	180	180	180	180	180
200	200	200	200	200	200	200	200
250	250	250	250	250	250	250	250
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550	550	550	550	550	550	550	550
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115

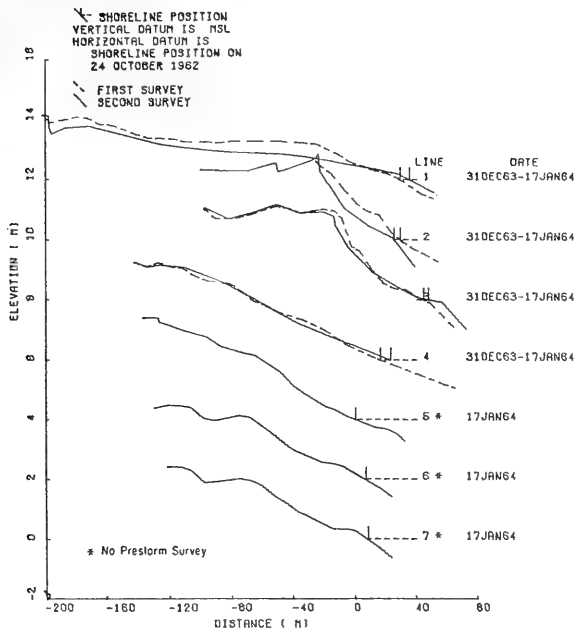
116

DATE 720110	DATE 720214	DATE 720317	DATE 720410	DATE 720521	DATE 721020	DATE 721208
SRVY 106	SRVY 107	SRVY 109	SRVY 110	SRVY 111	SRVY 112	SRVY 113
TIME 1200	TIME 1200	TIME 1200	TIME 1200	TIME 1300	TIME 1100	TIME 1800
00	00	00	00	00	00	00
50	50	50	50	50	50	50
100	100	100	100	100	100	100
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590	550	500	550	575	500	550
600	550	500	550	575	500	550
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620	550	500	550	575	500	550
630	550	500	550	575	500	550
640	550	500	550	575	500	550
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710	550	500	550	575	500	550
720	550	500	550	575	500	550
730	550	500	550	575	500	550
740	550	500	550	575	500	550
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760	550	500	550	575	500	550
770	550	500	550	575	500	550
780	550	500	550	575	500	550
790	550	500	550	575	500	550
800	550	500	550	575	500	550
810	550	500	550	575	500	550
820	550	500	550	575	500	550
830	550	500	550	575	500	550
840	550	500	550	575	500	550
850	550	500	550	575	500	550
860	550	500	550	575	500	550
870	550	500	550	575	500	550
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900	550	500	550	575	500	550
910	550	500	550	575	500	550
920	550	500	550	575	500	550
930	550	500	550	575	500	550
940	550	500	550	575	500	550
950	550	500	550	575	500	550
960	550	500	550	575	500	550
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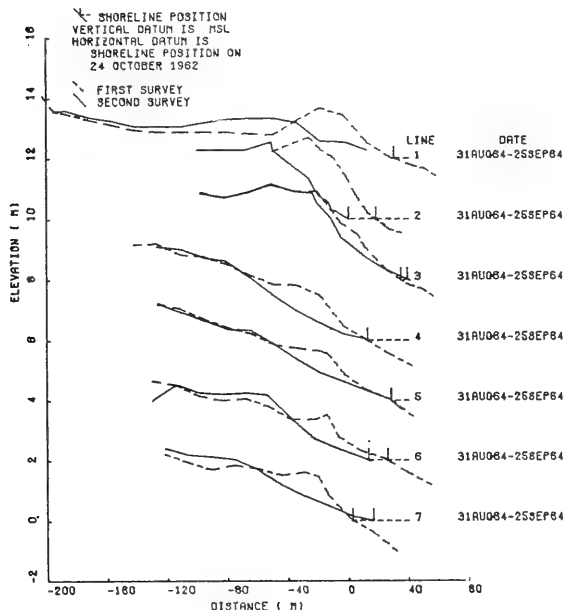
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SRVY 114	SRVY 115	SRVY 117	SRVY 118	SRVY 119	SRVY 120
TIME 1100	TIME 1100	TIME 0600	TIME 1800	TIME 1300	TIME 1100
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100	100	100	100	100	100
150	150	150	150	150	150
200	200	200	200	200	200
250	250	250	250	250	250
300	300	300	300	300	300
350	350	350	350	350	350
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500	500	500	500	500	500
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590	550	500	550	575	500
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620	550	500	550	575	500
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950	550	500	550	575	500
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APPENDIX C

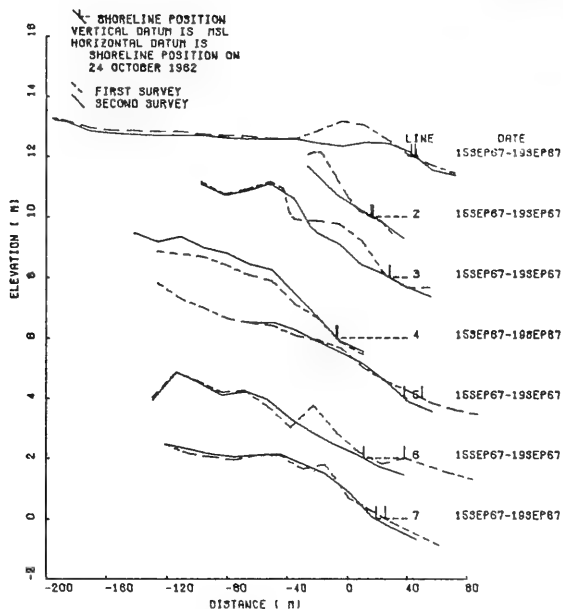
STORM CHANGE PLOTS - PROFILE COMPARISON
FOR SURVEY OF SEVEN PROFILE LINES AT ATLANTIC CITY



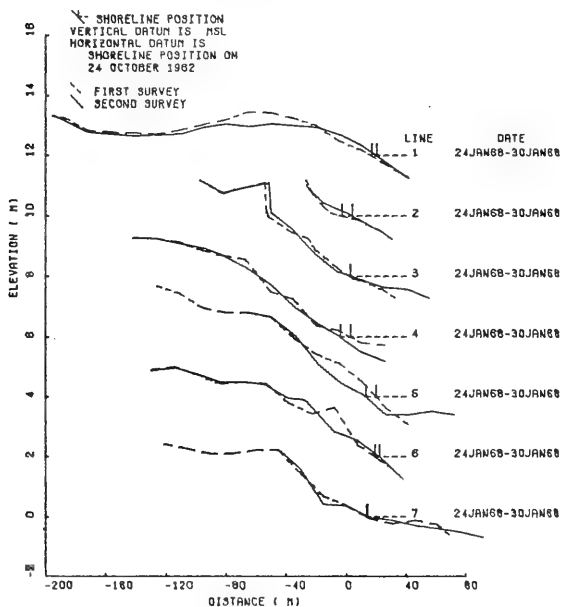
PROFILE COMPARISON FOR SURVEYS OF 7 PROFILE LINES AT
 ATLANTIC CITY NJ



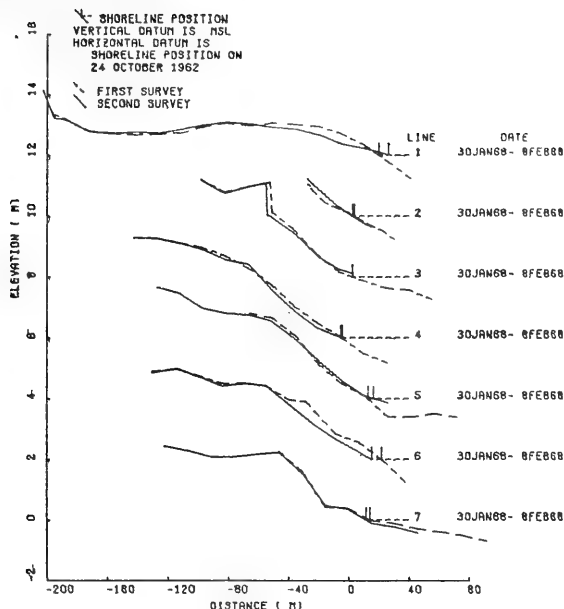
PROFILE COMPARISON FOR SURVEYS OF 7 PROFILE LINES AT
 ATLANTIC CITY NJ



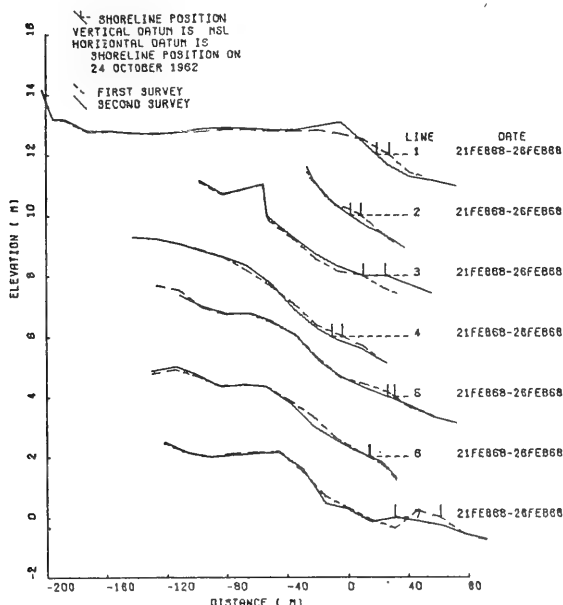
PROFILE COMPARISON FOR SURVEYS OF 7 PROFILE LINES AT
 ATLANTIC CITY NJ



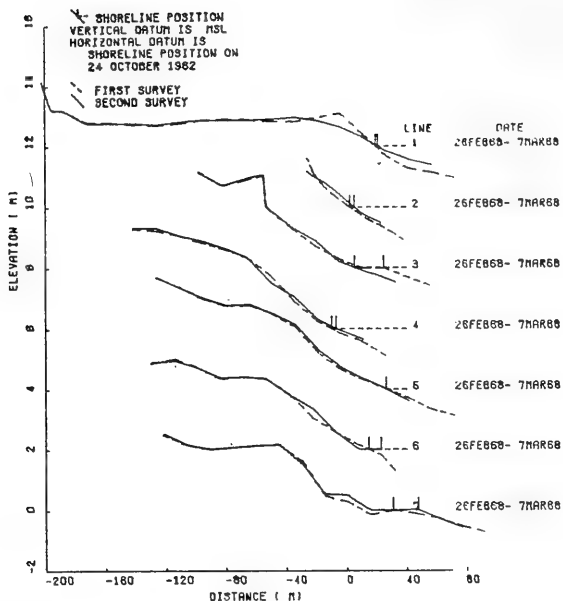
PROFILE COMPARISON FOR SURVEYS OF 7 PROFILE LINES AT
 ATLANTIC CITY NJ



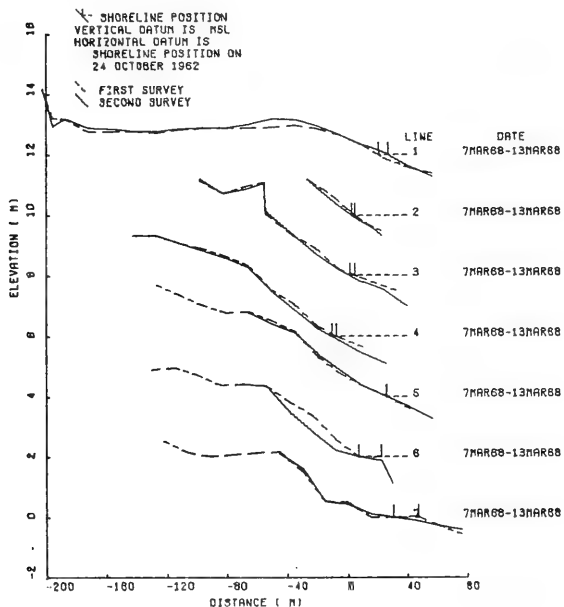
PROFILE COMPARISON FOR SURVEYS OF 7 PROFILE LINES AT
ATLANTIC CITY NJ



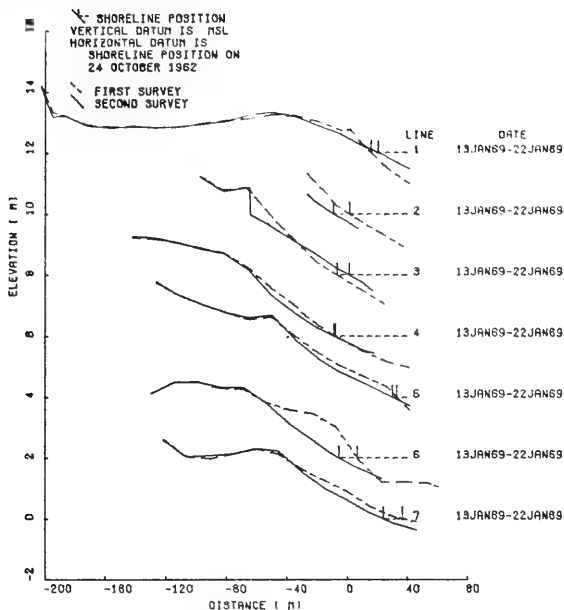
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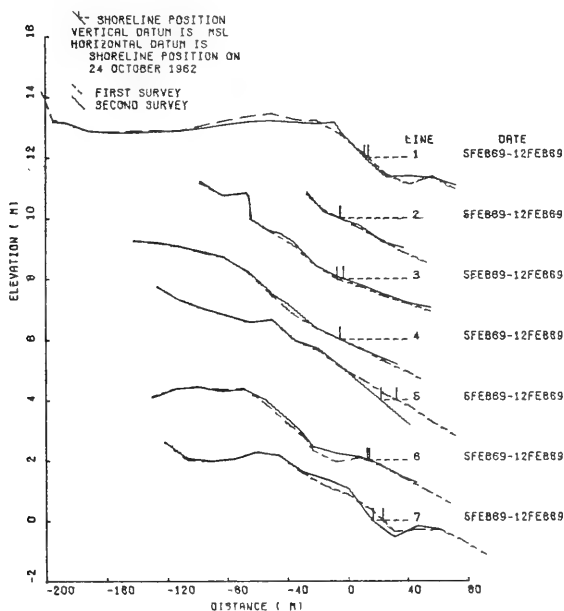
PROFILE COMPARISON FOR SURVEYS OF 7 PROFILE LINES AT
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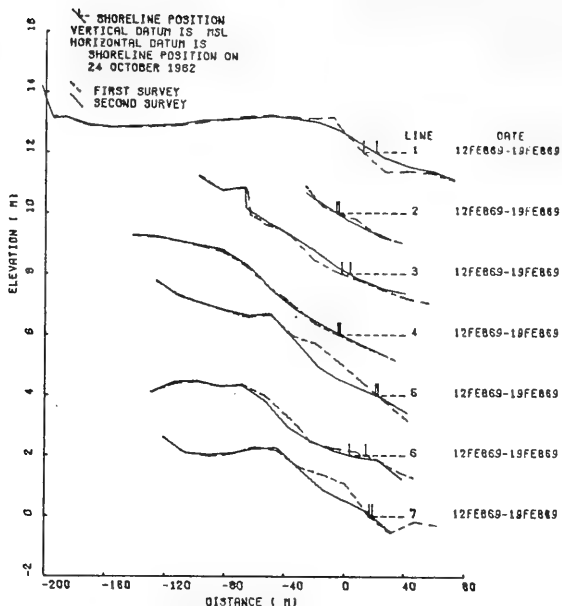
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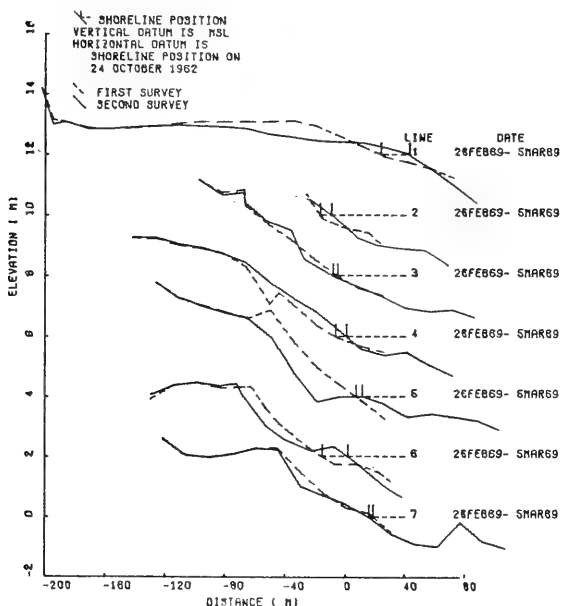
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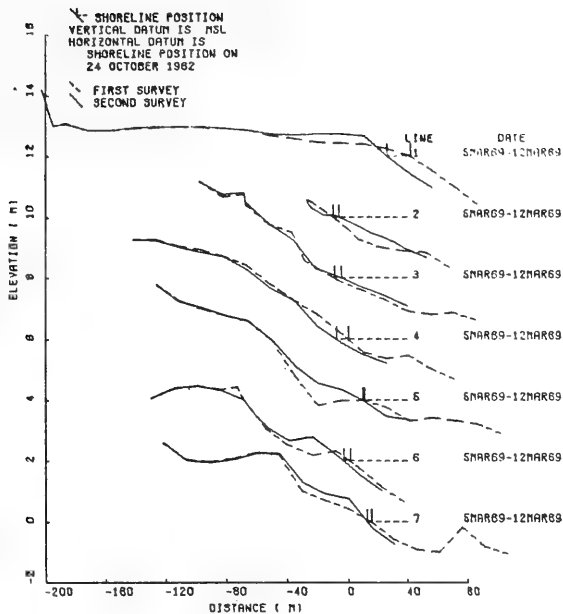
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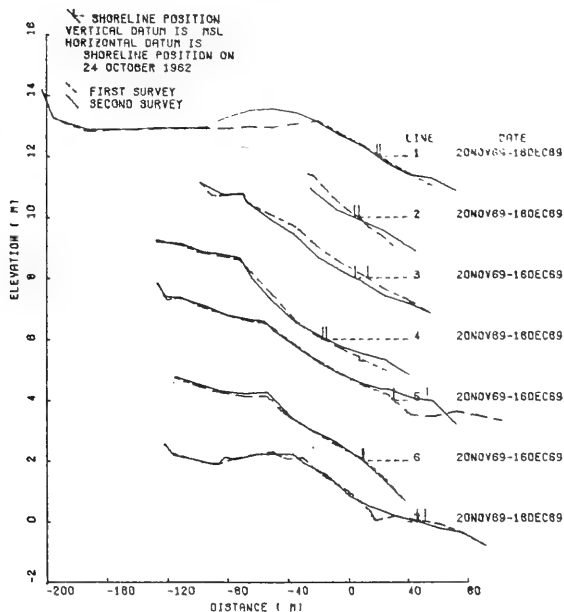
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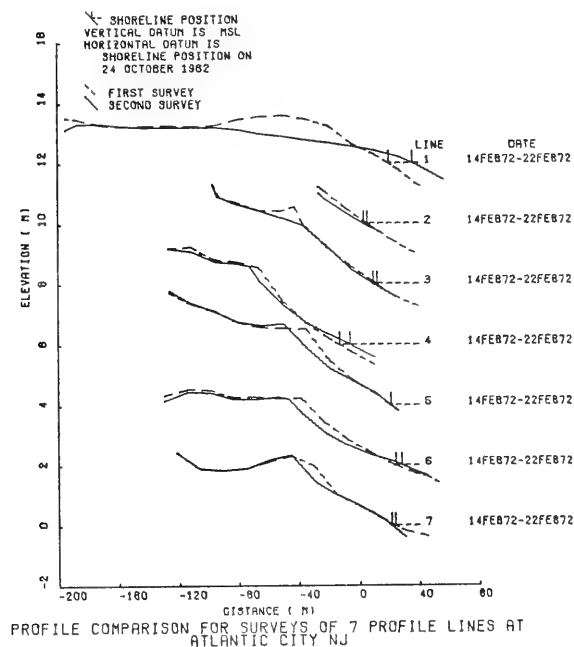
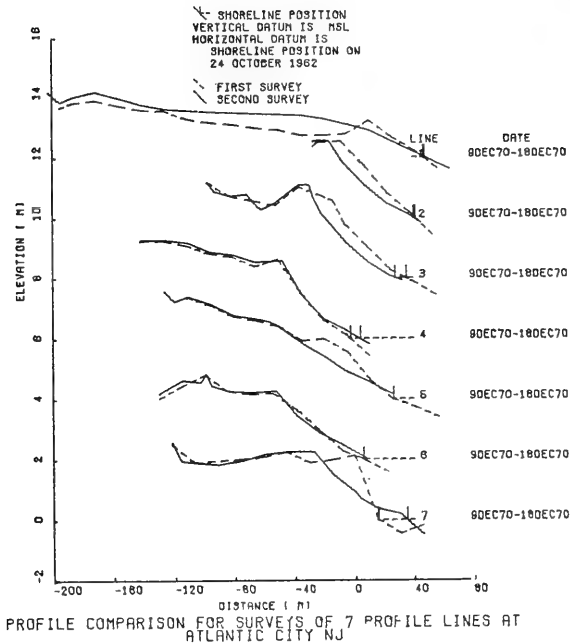
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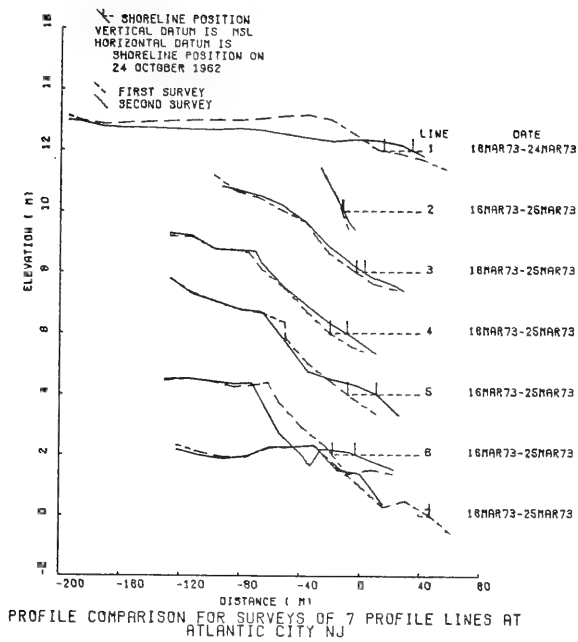


PROFILE COMPARISON FOR SURVEYS OF 7 PROFILE LINES AT
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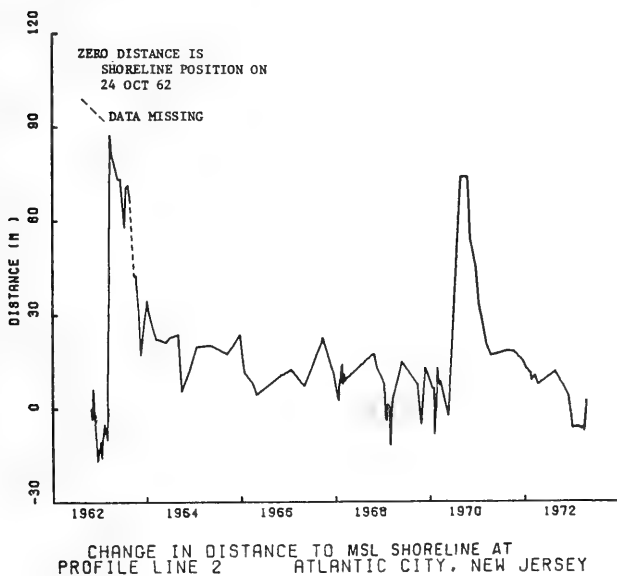
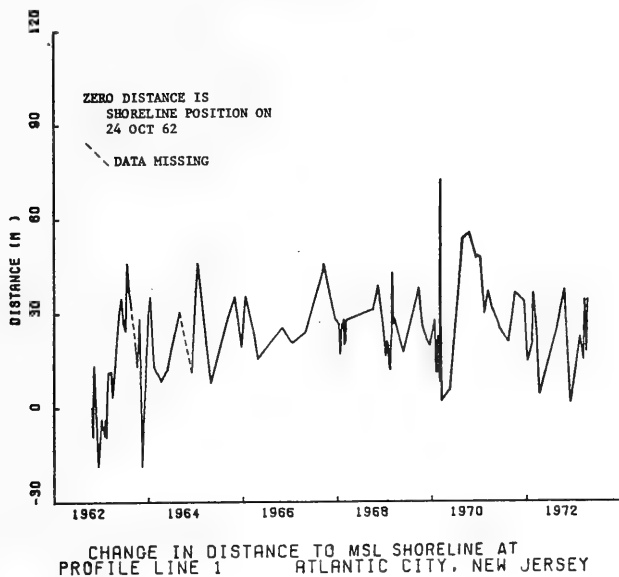
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 ATLANTIC CITY NJ

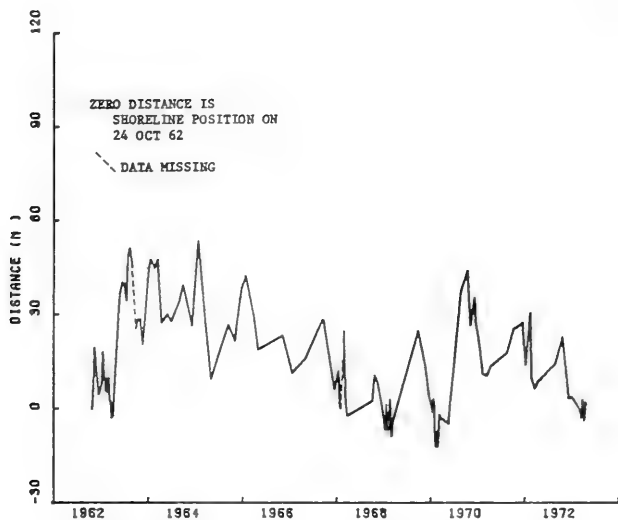




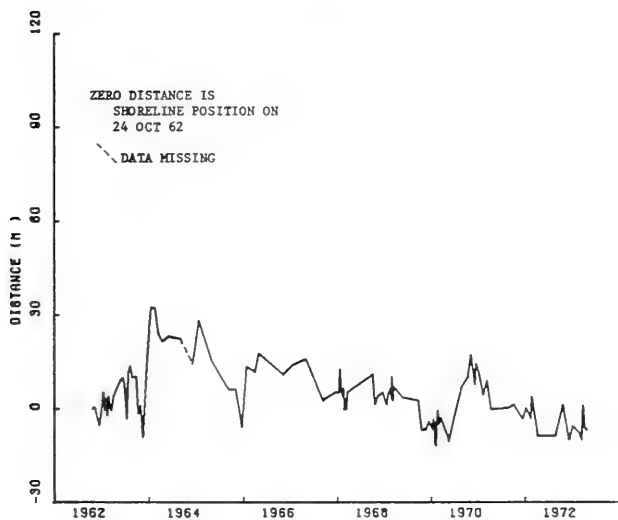
APPENDIX D

MSL SHORELINE CHANGES

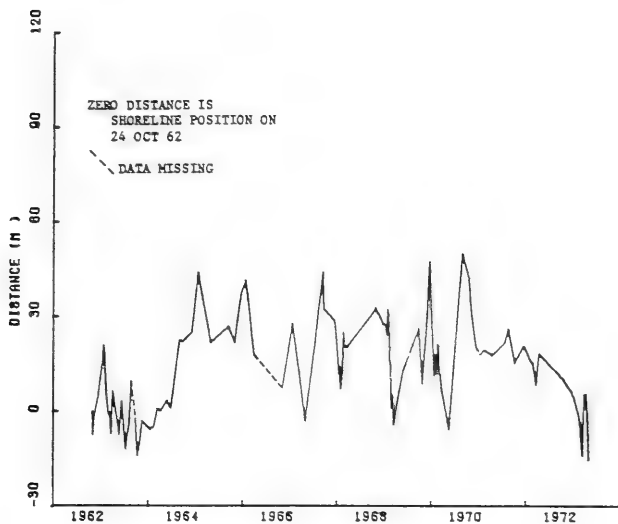




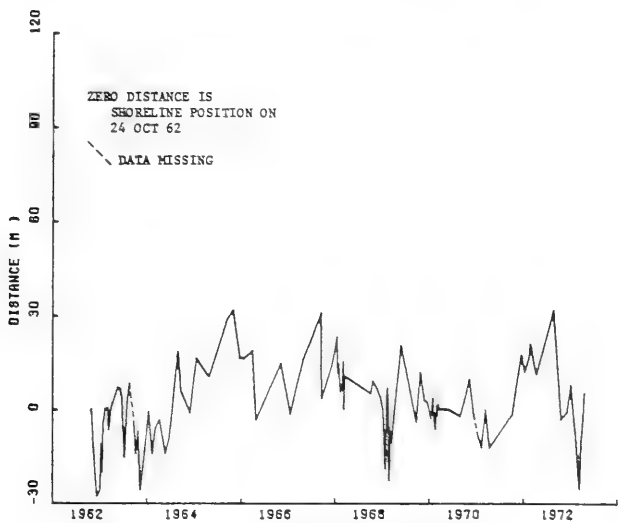
CHANGE IN DISTANCE TO MSL SHORELINE AT
PROFILE LINE 3 ATLANTIC CITY, NEW JERSEY



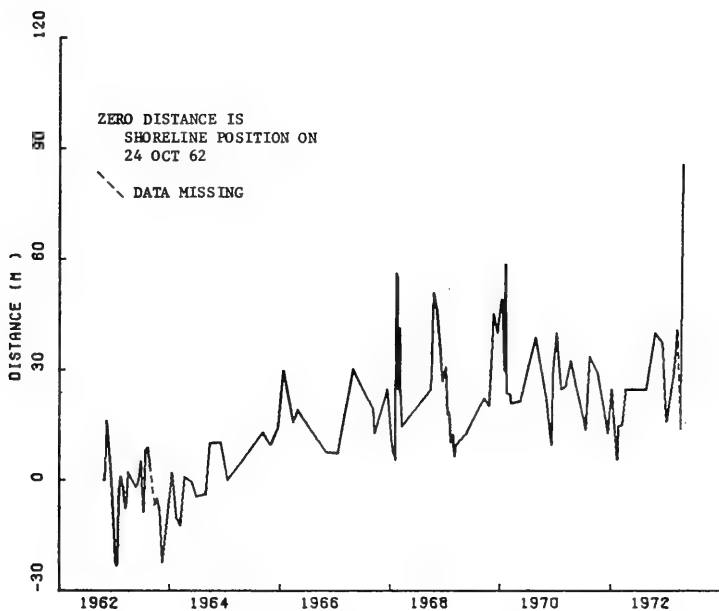
CHANGE IN DISTANCE TO MSL SHORELINE AT
PROFILE LINE 4 ATLANTIC CITY, NEW JERSEY



CHANGE IN DISTANCE TO MSL SHORELINE AT
PROFILE LINE 5 ATLANTIC CITY, NEW JERSEY



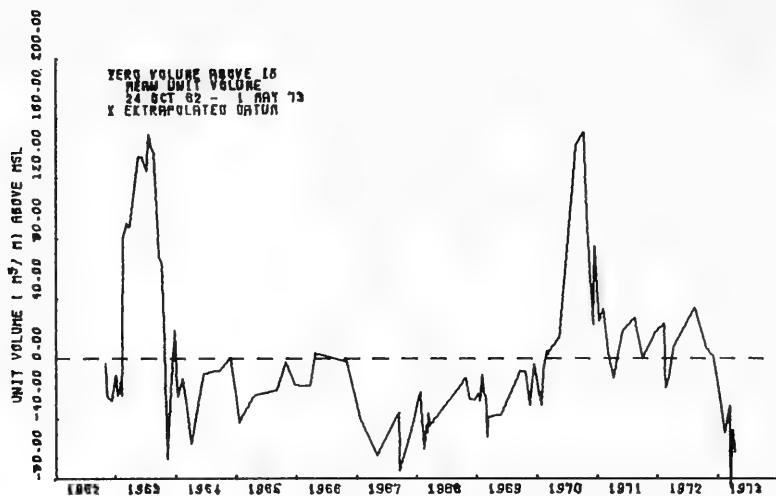
CHANGE IN DISTANCE TO MSL SHORELINE AT
PROFILE LINE 6 ATLANTIC CITY, NEW JERSEY



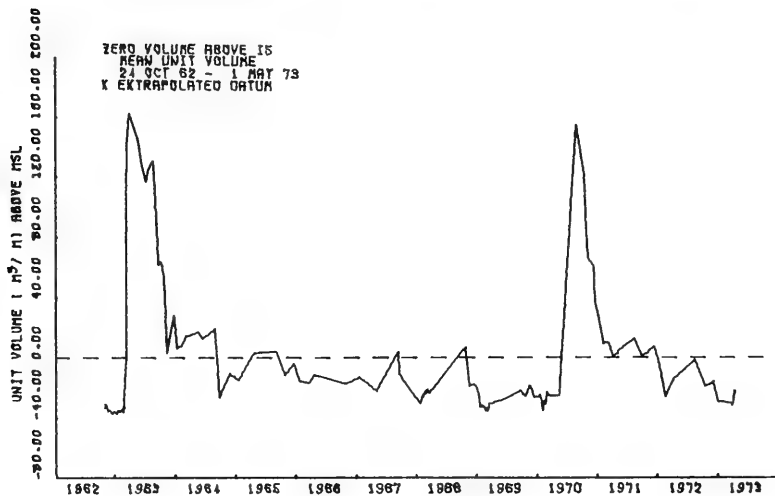
CHANGE IN DISTANCE TO MSL SHORELINE AT
 PROFILE LINE 7 ATLANTIC CITY, NEW JERSEY

APPENDIX E

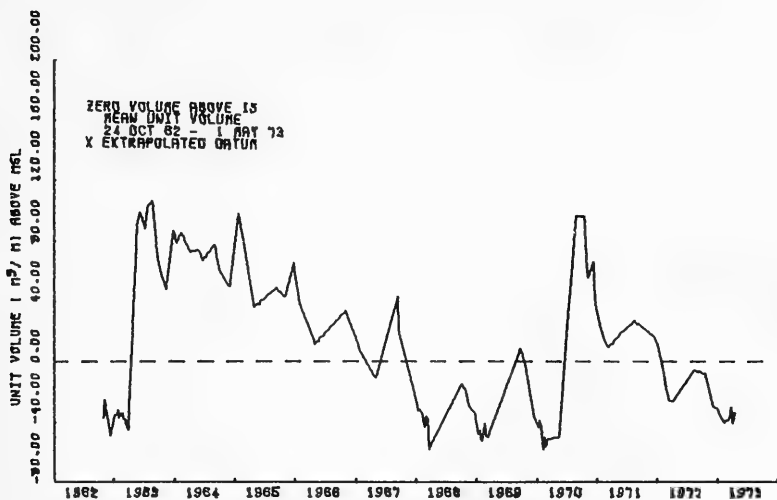
ABOVE MSL UNIT VOLUME CHANGES



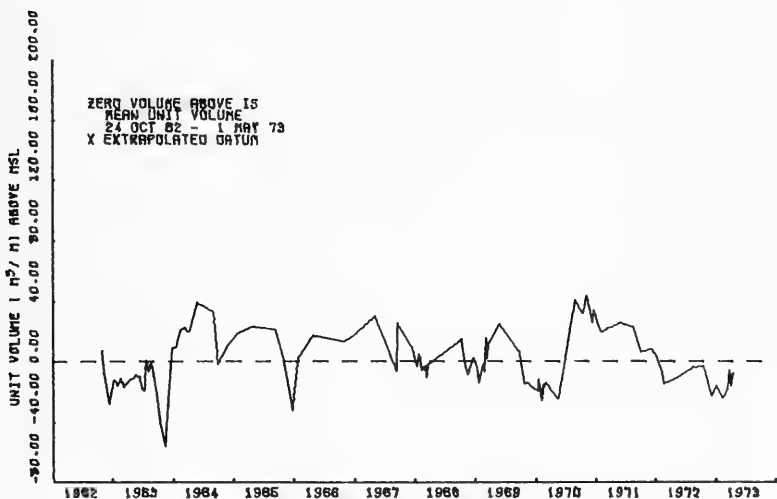
UNIT VOLUME CHANGES FOR PROFILE LINE 1 AT
ATLANTIC CITY NJ



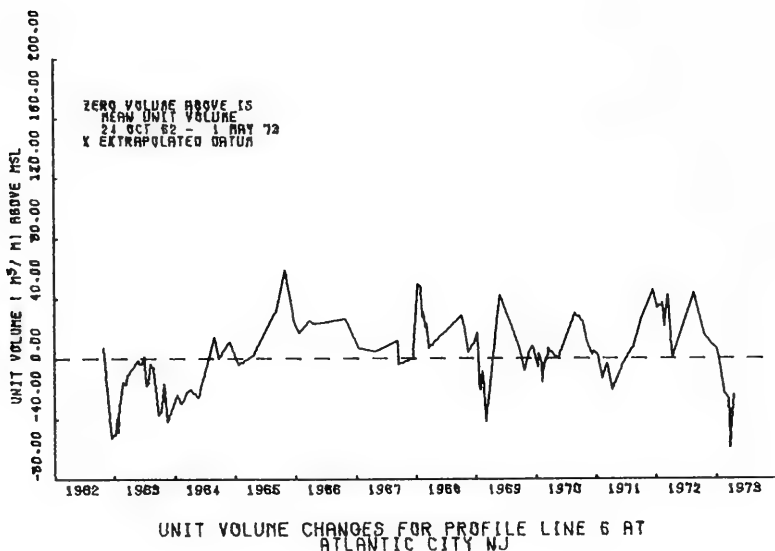
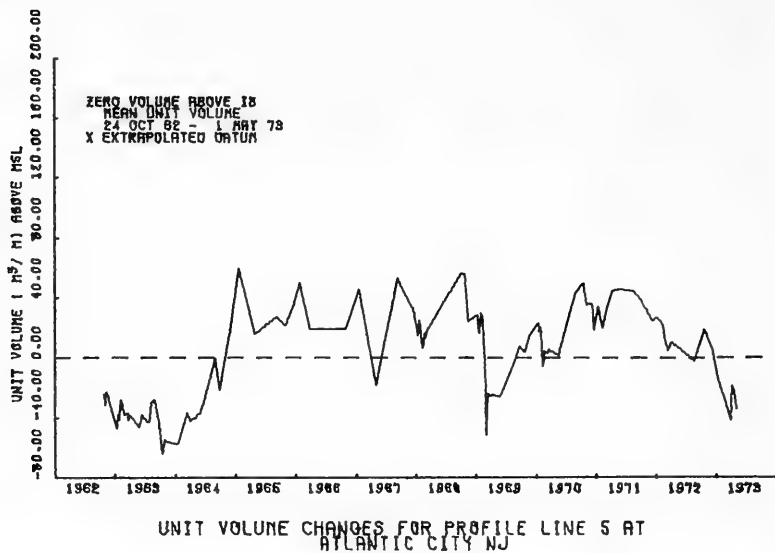
UNIT VOLUME CHANGES FOR PROFILE LINE 2 AT
ATLANTIC CITY NJ

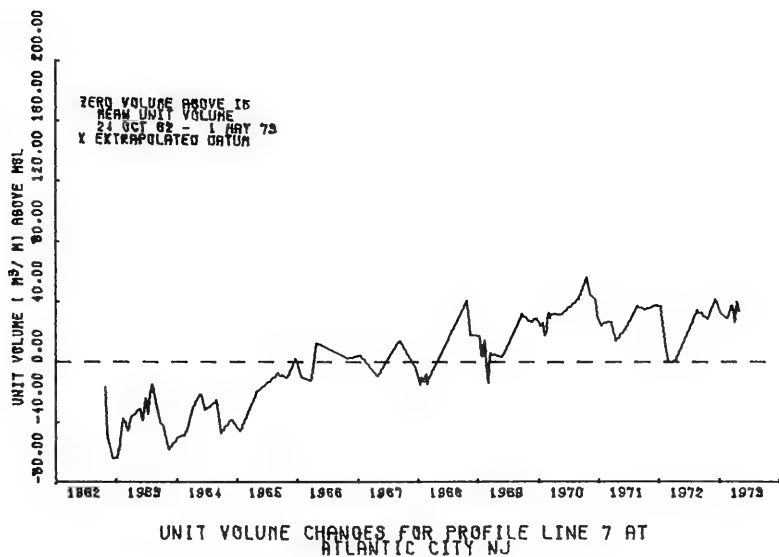


UNIT VOLUME CHANGES FOR PROFILE LINE 3 AT
ATLANTIC CITY NJ



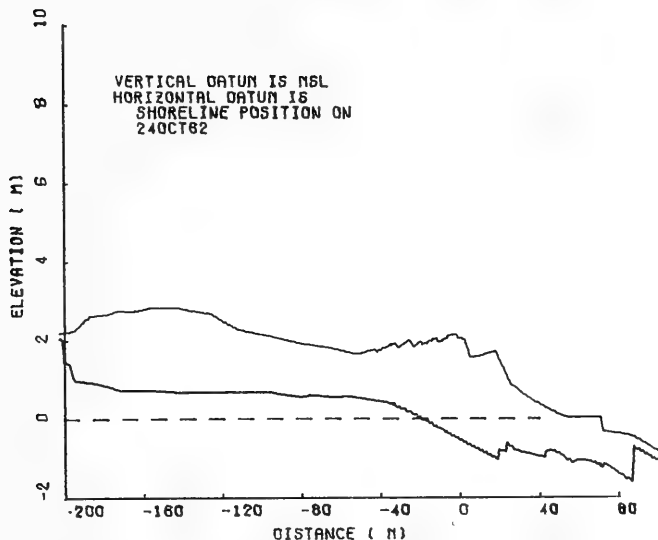
UNIT VOLUME CHANGES FOR PROFILE LINE 4 AT
ATLANTIC CITY NJ



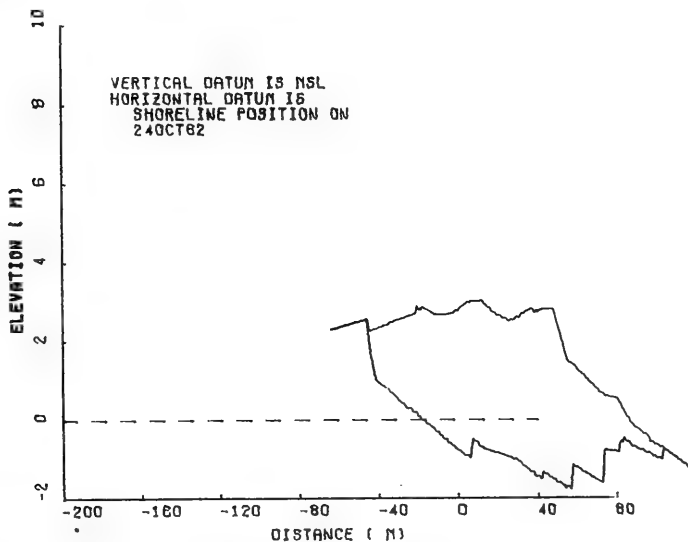


APPENDIX F

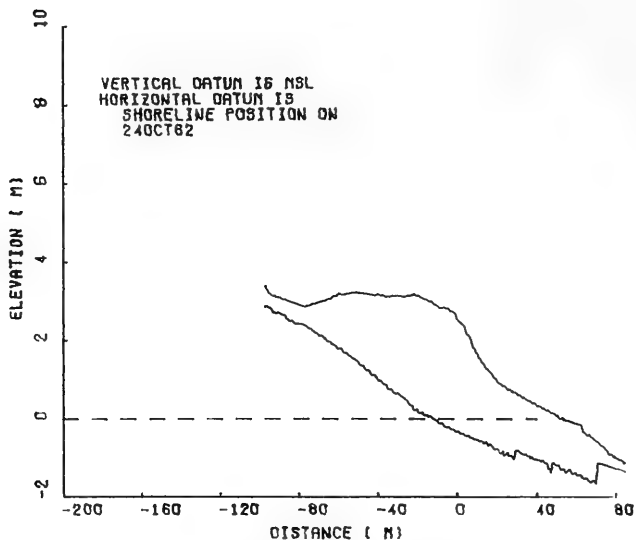
PROFILE ENVELOPES



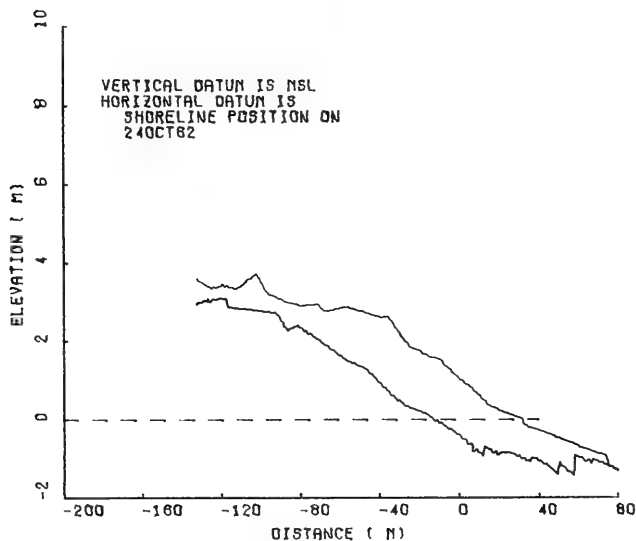
PROFILE ENVELOPE FOR PROFILE LINE 1 AT ATLANTIC CITY NJ
24OCT62 - 18APR73



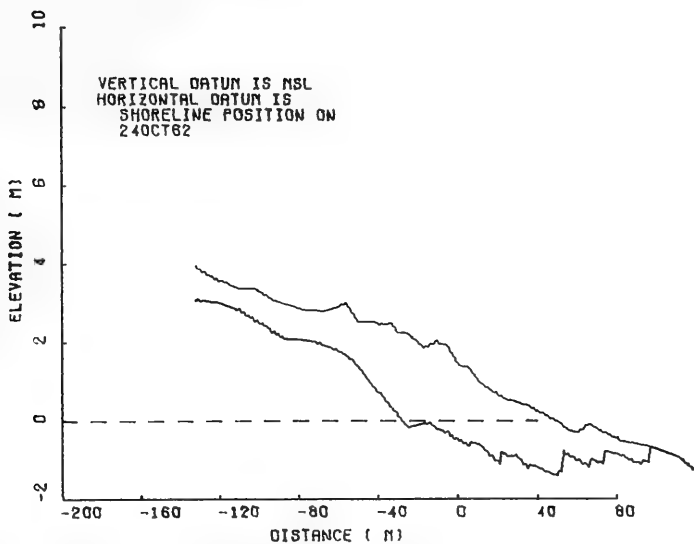
PROFILE ENVELOPE FOR PROFILE LINE 2 AT ATLANTIC CITY NJ
24OCT62 - 18APR73



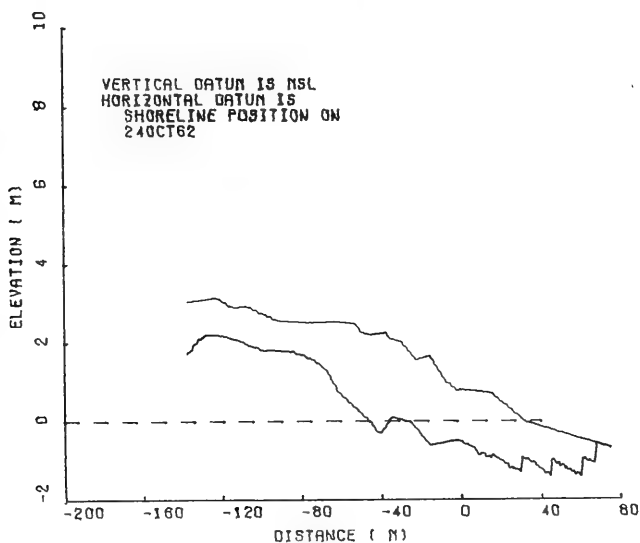
PROFILE ENVELOPE FOR PROFILE LINE 3 AT ATLANTIC CITY NJ
24OCT62 - 18APR73



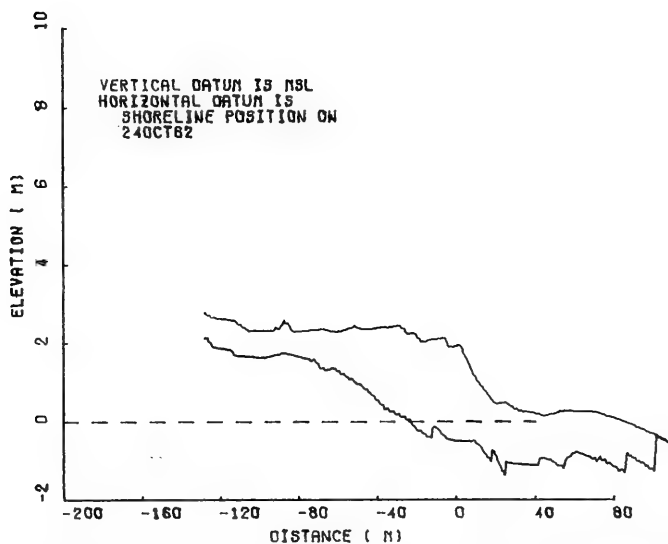
PROFILE ENVELOPE FOR PROFILE LINE 4 AT ATLANTIC CITY NJ
24OCT62 - 18APR73



PROFILE ENVELOPE FOR PROFILE LINE 5 AT ATLANTIC CITY NJ
24OCT62 - 1MAY73



PROFILE ENVELOPE FOR PROFILE LINE 6 AT ATLANTIC CITY NJ
24OCT62 - 18APR73



PROFILE ENVELOPE FOR PROFILE LINE 7 AT ATLANTIC CITY NJ
24OCT82 - 1MAY73

<p>McCann, Dennis P. Beach changes at Atlantic City, New Jersey (1962-73) / by Dennis P. McCann.--Fort Belvoir Va. : U.S. Army Coastal Engineering Research Center : Springfield, Va. : available from NTIS, 1981. [142] p. : ill., maps : 27 cm.--(Miscellaneous report / U.S. Army Coastal Engineering Research Center ; no. 81-3) Cover title. "March 1981." Repetitive surveys of the above MSL beach were made along seven profile lines at Atlantic City, New Jersey, from 1962 to 1973. Major beach-fill projects accomplished in 1963 and 1970 are discussed, and the effects of 17 storms are documented. 1. Atlantic City (N.J.). 2. Beach erosion. 3. Beach nourishment. 4. Beach profile. 5. Beaches. 6. Shore protection. 7. Shoreline changes. I. Beach Evaluation Program. II. Title. III. Series: Miscellaneous report (Coastal Engineering Research Center (U.S.)) ; no. 81-3.</p>	<p>TC203 .U58lmr no. 81-3 627</p>
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<p>McCann, Dennis P. Beach changes at Atlantic City, New Jersey (1962-73) / by Dennis P. McCann.--Fort Belvoir Va. : U.S. Army Coastal Engineering Research Center ; Springfield, Va. : available from NTIS, 1981. [142] p. : ill., maps : 27 cm.--(Miscellaneous report / U.S. Army Coastal Engineering Research Center ; no. 81-3) Cover title. "March 1981." Repetitive surveys of the above MSL beach were made along seven profile lines at Atlantic City, New Jersey, from 1962 to 1973. Major beach-fill projects accomplished in 1963 and 1970 are discussed, and the effects of 17 storms are documented. 1. Atlantic City (N.J.). 2. Beach erosion. 3. Beach nourishment. 4. Beach profile. 5. Beaches. 6. Shore protection. 7. Shoreline changes. I. Beach Evaluation Program. II. Title. III. Series: Miscellaneous report (Coastal Engineering Research Center (U.S.)) ; no. 81-3.</p>	<p>TC203 .U581mr no. 81-3 627</p>



